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OCTOBER 1995

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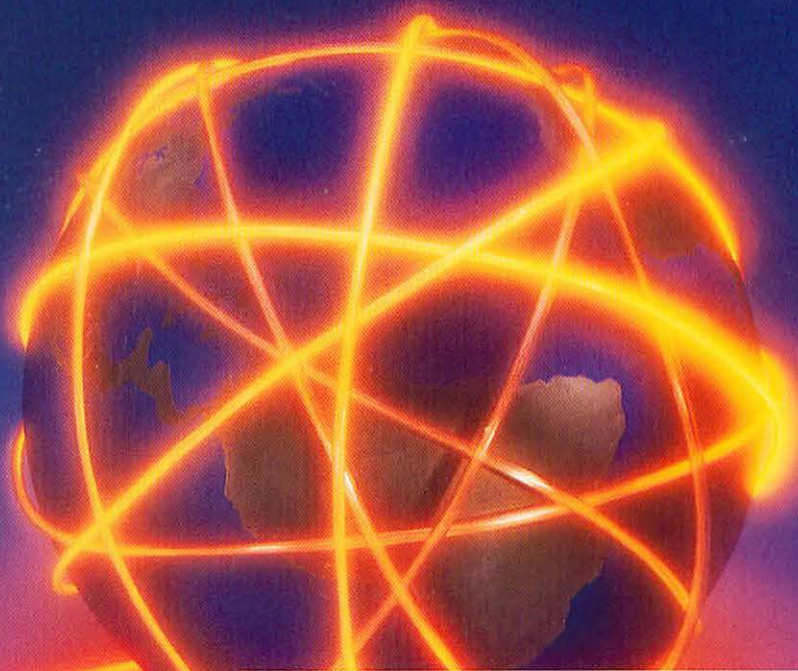
- Best Browsers
- Easiest Connections

Multimedia Marvels


New PCI Power Macs
Intro Hot Phone and Video
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Storage to Go

Top Portable Options



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C
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Y
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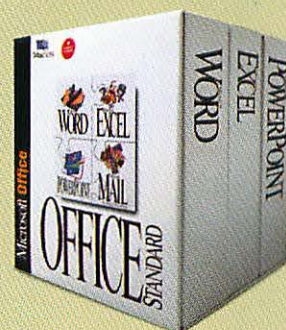
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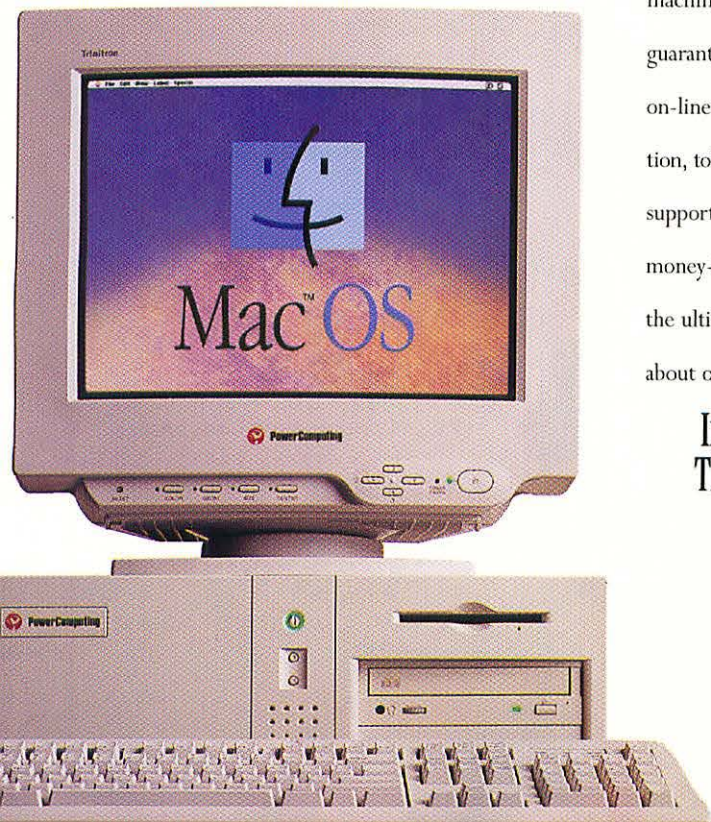
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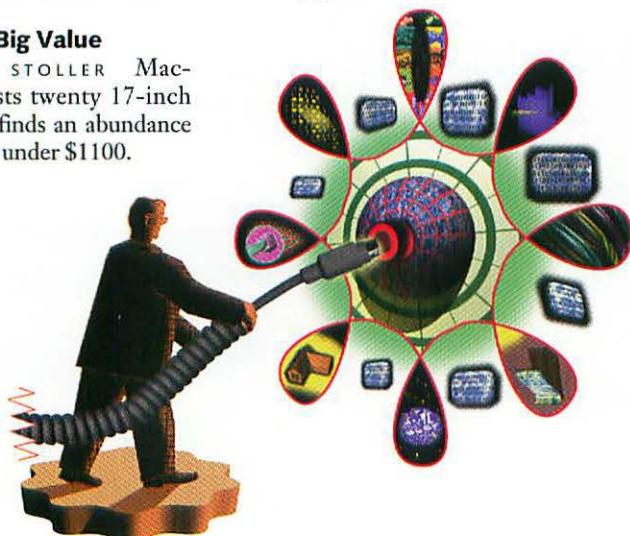
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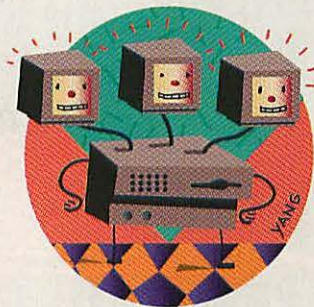
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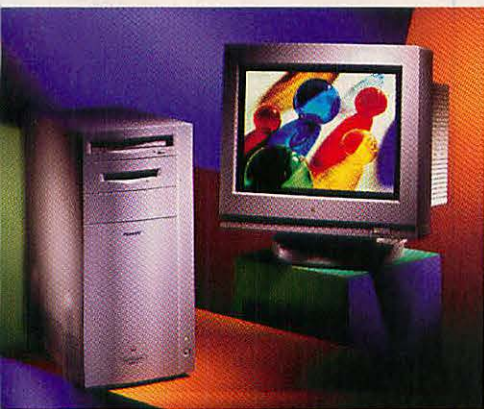
October 1995, Volume 12, Number 10 Macworld (ISSN 0741-8547) is published monthly by Macworld Communications, Inc. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0505. Subscription orders and inquiries should be directed to 800/288-6848 or 303/604-1465. Subscription rates are \$30 for 12 issues, \$60 for 24 issues, and \$90 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$16 per year for postage for Canada and Mexico subscribers. Add \$69 per year for postage to all other countries. Second-class postage paid at San Francisco, California, and at additional mailing offices. Postmaster: Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80323-4529. Printed in the U.S.A.

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Photo by Stan Musilek

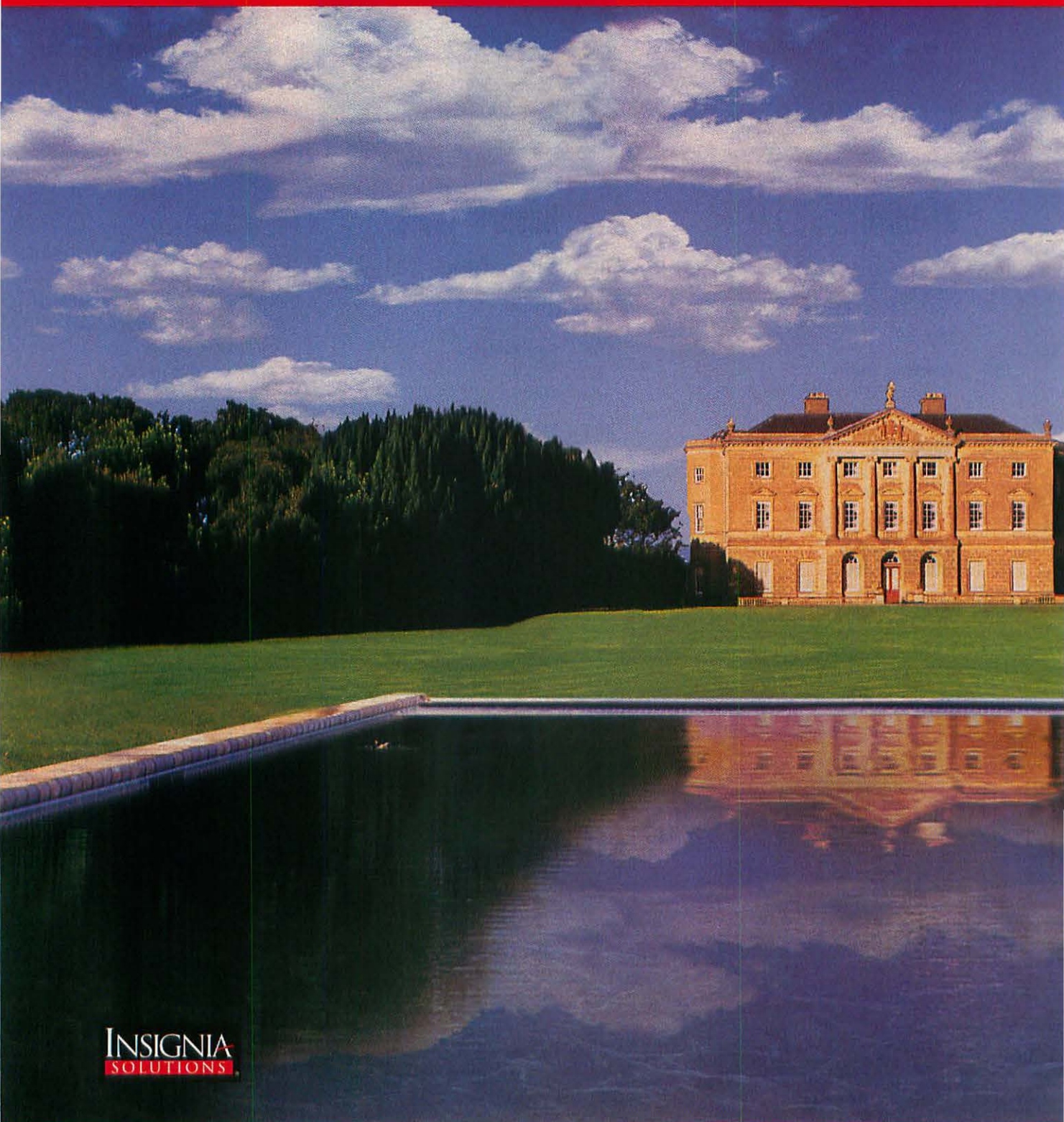
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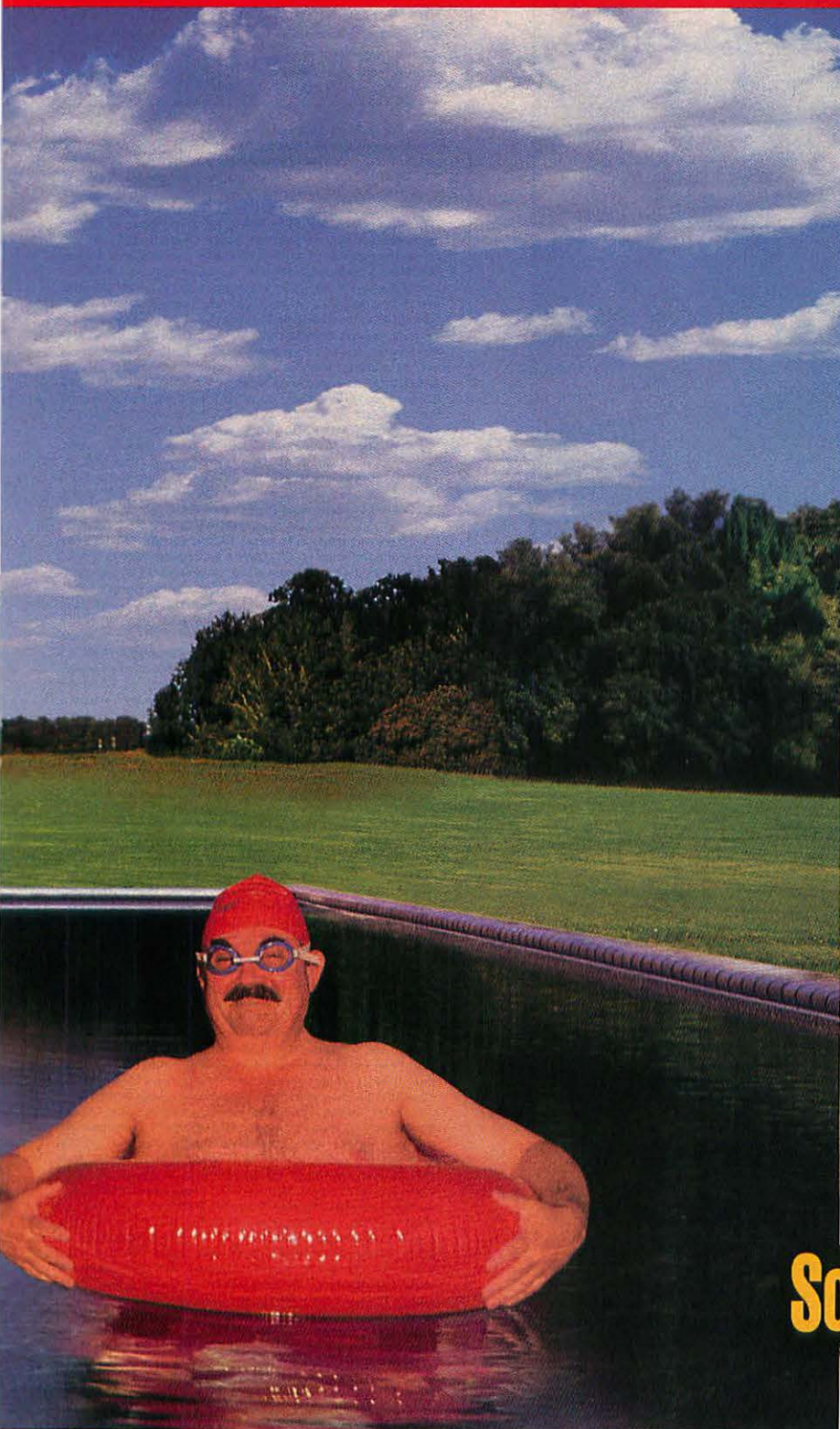
Apple's latest, the screamingly fast Power Mac 9500/132, reviewed page 60.

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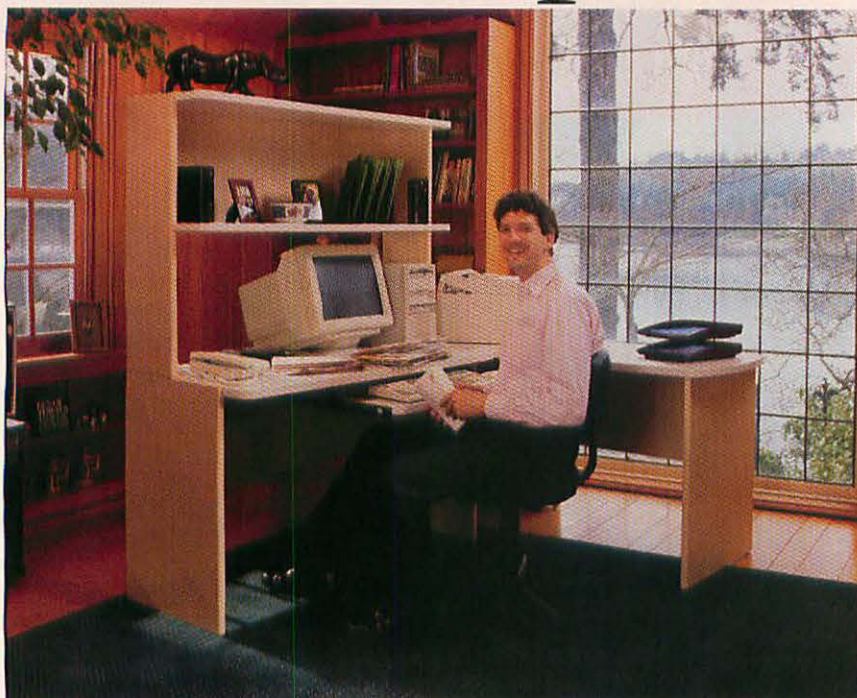
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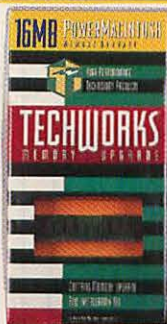


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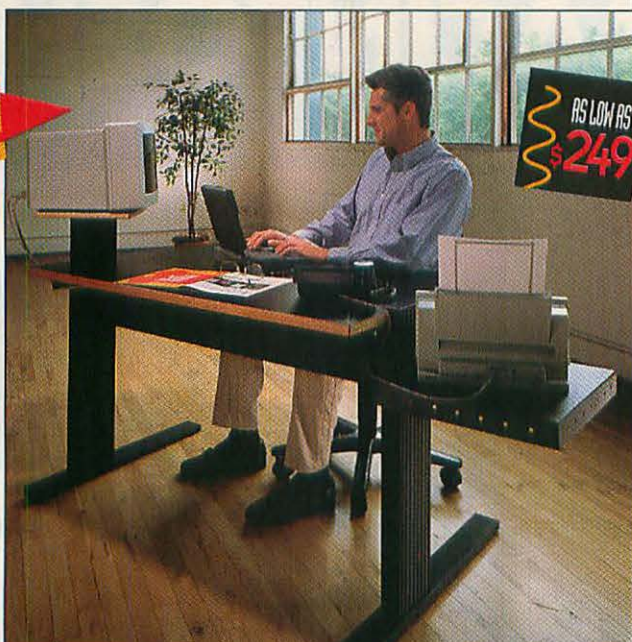
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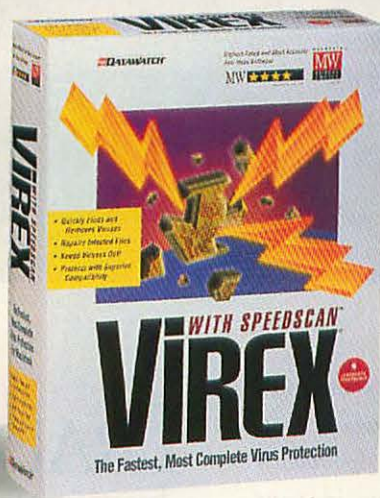
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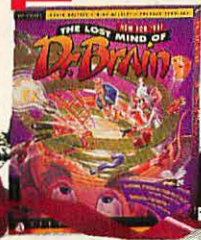


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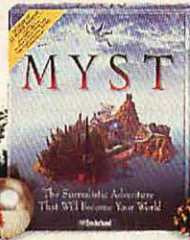
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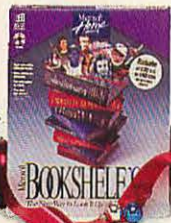
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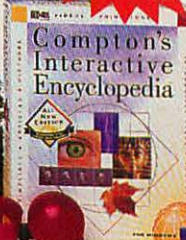
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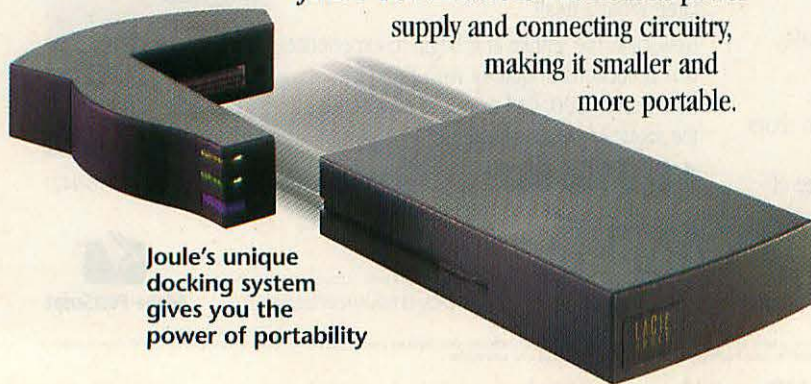
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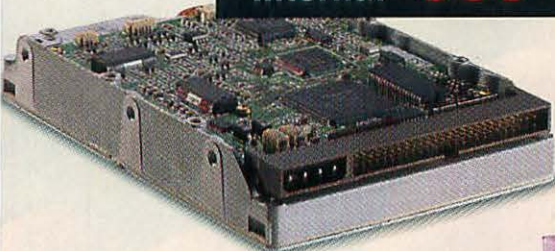
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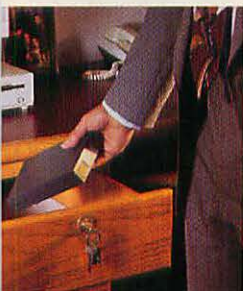


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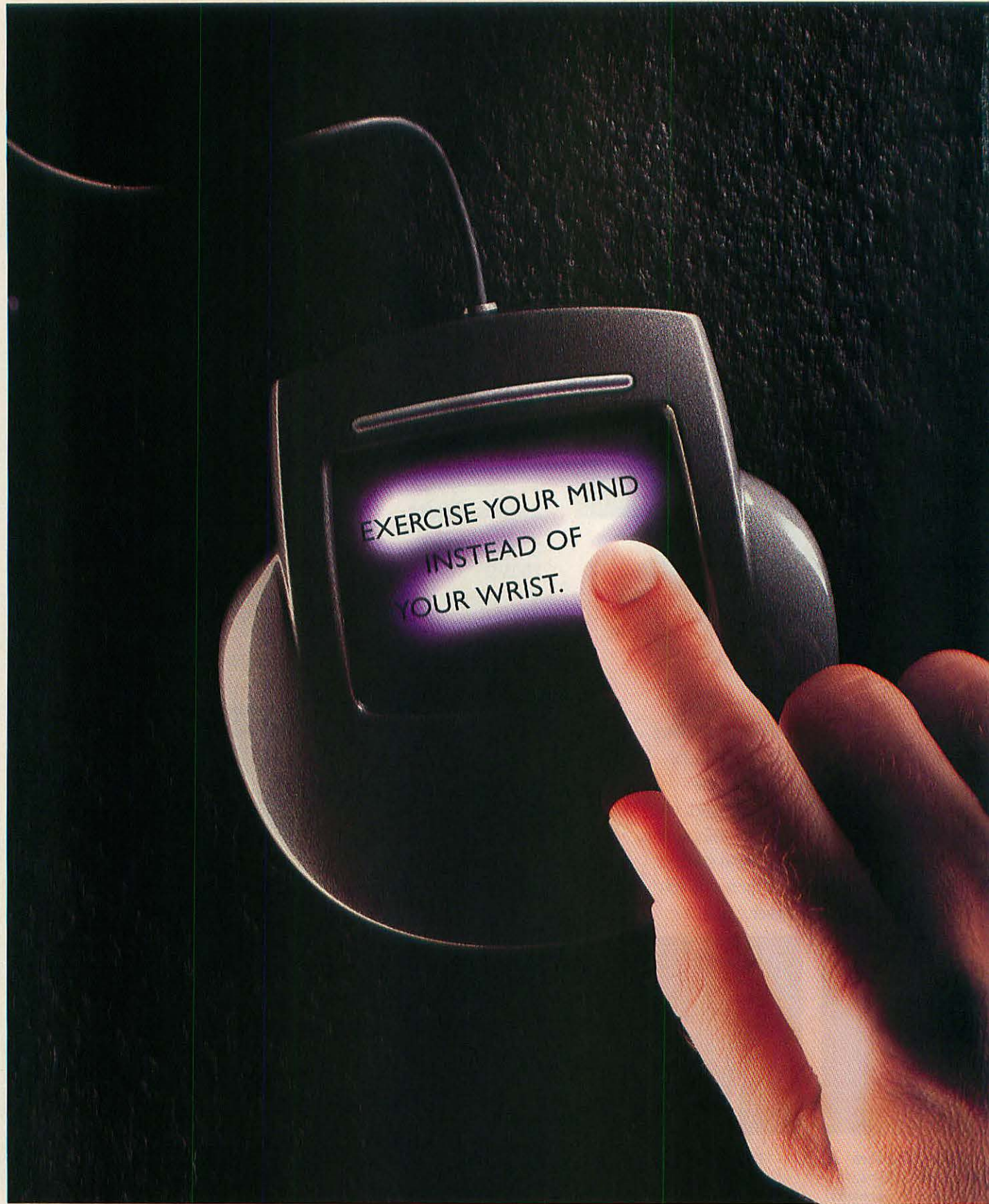
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Manifest Destiny

The Mac's special relationship with the Web

CONCEPTIONS OF THE future rarely match what eventually comes to pass (remember those artists' renderings from the early 1960s promising turbine-powered cars by 1970?). Just last year, everywhere we turned we read about the information superhighway—a cable-based miracle network that would deliver video-on-demand and revolutionize our shopping habits. Gone the way of the turbine car.

While the popular press touted the infobahn vision, hundreds of thousands of people discovered that a broad-based method of distributing electronic information was here already in the Internet. And this, rather than video-on-demand and electronic shopping, was what they really wanted (as predicted in "Dream-Net," *Macworld*, October 1994). Today you can barely turn around without encountering references to the Internet, commercial online services, and the Net's graphical offspring, the World Wide Web—on taxicab placards, bank ATMs, TV programs, and even cereal boxes.

The Mac's Powerful Presence

Macintosh users need hardly be reminded that we represent only 8.5 percent of the personal computer market. Every time we walk into a software retailer looking for new applications or updates to ones we already own, we come face to face with the evidence. But what you may not know is that Macintosh users play a disproportionately important role in the growth of online activity. According to industry analysts, around 25 percent of all people using America Online and around 15 percent of CompuServe subscribers are logging in from Macs, and a recent study by the Georgia Institute of Technology shows a similar—and rising—percentage of Macintosh users active on the World Wide Web. According to a May 1995 Dataquest study, 19 percent of the Internet population is Macintosh users.

This disproportionate presence holds true not only for Net trollers and Web

surfers—the people exploring what the online community has to offer—but also on the server side of the equation. According to the same Georgia Tech study, Mac-based Web servers constitute over a fifth of those in use by information providers.

Let me hazard a few hypotheses as to what's behind the Mac's online extroversion. First, people who buy Macs are pioneers. If you were a conformist, you'd have bought a PC. The same pioneer spirit that draws you to the Mac draws you to the vast frontier of online possibilities. Add to that the fact that the Mac's interface supports online exploration, whereas the PC punishes it by throwing up an inhospitable thicket of complexity.

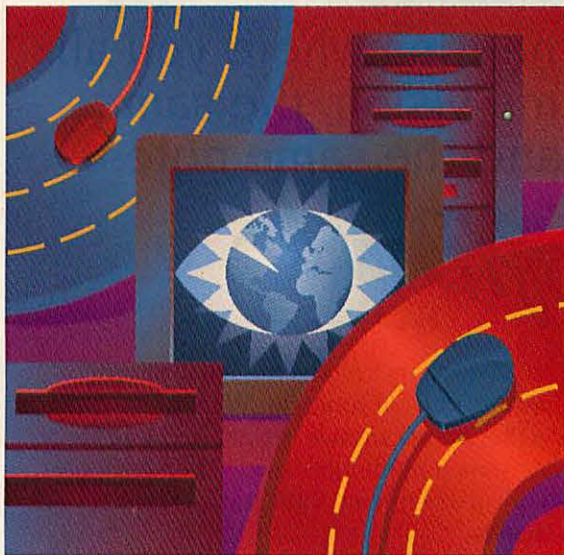
Next, Macs are widely used in higher education, and universities were major

A Surfing Server

The Mac's suitability for Web authoring is unsurprising. Less obvious, perhaps, is the Mac's strength as a Web server. Hardly anyone uses PCs as Web servers. The available server software is a pain to configure, and the content-development tools lag far behind. Unix still leads in the server environment because the Internet was founded on Unix servers. But the Mac has some strong points that could change that. One is price; a Mac costs half as much as a comparable Unix machine. Also, a Mac server is a lot easier to set up and use; Unix servers need Unix experts to get them going. On the downside, the current Mac hardware limits simultaneous connections, which can produce performance bottlenecks for large sites. Unix offers more custom tools, but a decent

collection of server tools exists for the Mac—more than you need to create a simple Web site.

Finally, the Mac's networking architecture is a good fit with direct Internet connections. Properly configured, MacTCP is relatively easy for users. Network administrators can handle most of the hard work and send users the proper numbers to plug into their control panels. Open Transport will further simplify user setup and expand the number of multiple-user connections MacTCP can support.



players in the development of the Internet. This explains not only the large number of Mac-based servers but also the prevalence of good Web-browsing and -authoring tools. Having lots of Mac clients on the Web is important, but the Mac could become the road warrior of the infobahn if it can hang on to its leadership in Web production. It's the platform of choice in design, publishing, multimedia, and marketing communications, and publishing on the Web is a natural extension of those strengths.

Web Evangelism

The Mac is well positioned to play a dominant role in the Web's rapid development, which will create a demand for many new product solutions. Apple should do whatever it can to support the many Macintosh users who have already jumped onto the Net—especially forward-thinking smaller developers—just as it did when the Mac helped create desktop publishing. Doing so will establish another prosperous market for the Mac,

continues

with the ability to yield innovations for years to come.

One clear opportunity is in Web page-development tools. Currently, designers must use simple text editors to write HTML (HyperText Markup Language) scripts to create Web pages. They hate it because it's more like programming than page design. There's no Web counterpart yet for PageMaker or QuarkXPress that lets you see the pages as you edit and manipulate them, though both

Adobe and Quark have announced that they are adding Web-publishing features in their programs' next versions. Novell's WordPerfect and Microsoft Word will do the same. But don't be surprised if the big guys are bested by a new company that crops up from nowhere to offer a product completely optimized for online publishing. Ceneca Communications, for example, is one to watch in this area.

Apple should also evaluate its technology portfolio and do what's necessary

to optimize for the Web. Let smaller developers leverage off the power of built-in technology like QuickDraw 3D, QuickTime VR, and other Apple tools.

OpenDoc and the Internet

The most important technology Apple and third-party developers can leverage to promote Internet development is OpenDoc. By letting developers build smaller, more targeted parts, OpenDoc suits precisely the kind of developers that are attracted to the Internet. It will let them build businesses based on quickly fielding products that meet the Web's fast-changing needs, without getting bogged down in the distribution costs associated with traditional software channels. OpenDoc tools will also benefit Web users, giving them more product options and permitting them to operate efficiently, without a lot of resource overhead.

This minimalist approach is already evident in the design of Web browsers, which are made to run on minimal systems and across platforms. Because the Net continues to evolve, browsers have been designed to handle just basic HTML and sometimes a few other types of files. But their architecture allows for tiny helper applications you can swap in and out, depending on what sort of files you want to use and on changing standards. Most helper applications focus on doing one or two tasks very well while running under 1MB of RAM. In some ways, it's OpenDoc before OpenDoc exists.

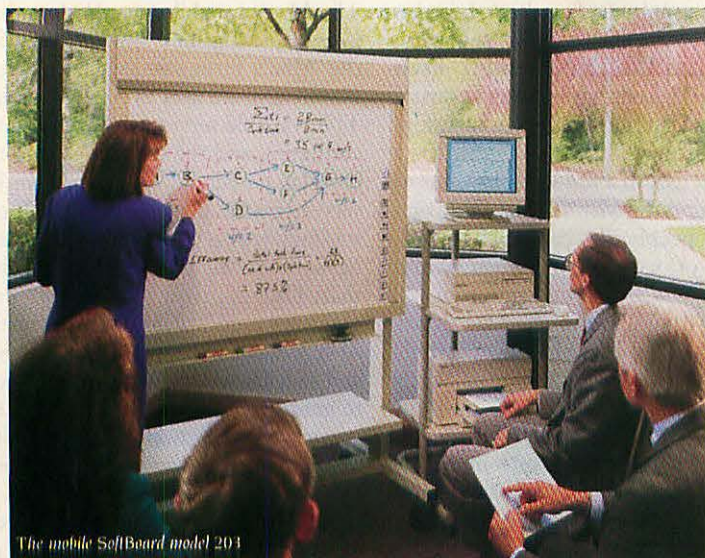
CyberDog, Apple's own set of OpenDoc parts, will let Web surfers create links between any desktop applications that support OpenDoc and the Internet. It may also encourage other developers to build OpenDoc parts for the Internet that augment CyberDog's offerings.

The Next Link

For our part, *Macworld* will be spending more time watching the Net and helping you take advantage of the online explosion. This month we introduce a four-part series, "Internet Essentials." The first two parts are "Make the Right Connection" and "Pick the Best Browser." In next month's *Macworld*, we will tell you how to build your own Web pages and how to deal with online security issues.

Web surfers, be sure to visit our new Web site (<http://www.macworld.com>). The NetSmart section is a great place to learn more about the Net. And however you participate in the Internet community, drop me a line to share your reflections on this expanding online galaxy. **m**

Research assistance by MATTHEW HAWN of Macworld Online.



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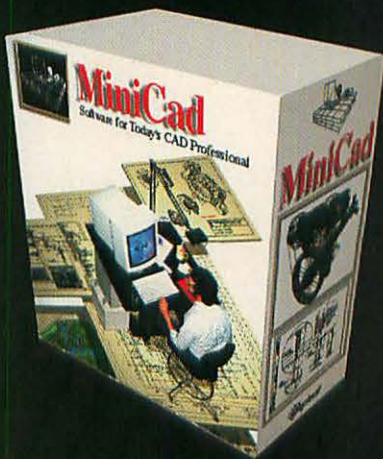
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Letters

Give Zip Five Stars!

AS AN OWNER OF AN IOMEGA ZIP drive, I heartily agree with Gene Steinberg's conclusion that the Zip drive is a remarkable product that delivers everything promised and then some (*Reviews*, July 1995). However, I was surprised by the Zip's four-star rating. While I realize four stars is nothing to sneeze at, I have been nothing but thrilled with my Zip's performance and value and don't see any reason why this beautiful device didn't receive that fifth star. Iomega has almost singlehandedly created a new standard for mass media storage, durability, and price/performance, and its technical support both on AOL and via phone, has been superlative.

I know it's not often a product gets five big ones. But if you peruse the Iomega conference on America Online and listen to the many ecstatic Zippers, and then consider that Iomega has created a removable-storage device that's faster, smaller, more durable, and far more inexpensive than its closest competitors, I think you'll agree with me that Iomega perhaps wasn't given its due credit.

Craig J. Weiland
via America Online

YOUR REVIEW OF THE ZIP DRIVE IS absolutely correct—Iomega may have shown us the next generation of floppy disks. The drive is just wonderful! It was difficult to find, and the disks are not easy to find either, but hey, with this device I was able to replace the nearly 400 floppy disks littering my computer area with just 7 Zip disks! Hooray! I agree that the lack of a power switch and full SCSI identification are annoying. But consider this—these are the worst problems of a first-run product, which means it can only get better. This is one time when the product lives up to the advertisements.

Jerry Levy
Washington, D.C.



Tip of the Day

THREE DAYS AGO I BLITHELY BEGAN feeding my Power Mac the 33 disks I had recently received from Microsoft as the Office 4.2.1 maintenance release. Had I known just how much maintenance was involved, I might have simply left all those disks in their plastic wrapper. After five reinstalls; four phone calls to technical support; multiple trips from the Preferences file to the Trash; and other voodoo to solve the "cannot find Word," "cannot find Help," and "cannot find Office Setup" messages—by day's end things were still missing and couldn't be found.

I turned on my computer this morning, launching Word (much faster, I must say) and here was today's Tip of the Day: "Did you know . . . Things that go away by themselves can come back by themselves."

Wow! That's incredible. No more reinstalls and no more calls to MS; no, today I'm just going to sit back, relax, and see if this fortune comes true.

Jeb Sanford
McLean, Virginia

Guyworld

THANKS FOR DEFENDING Microsoft's right to do business without a lot of government interference (*Wise Guy*, July 1995). You described perfectly the no-win situation of a company successful enough to make its competitors jealous: if it charges too much, it is gouging the consumer, but if it charges too little, it is guilty of unfair competition.

But, Guy, you gave the Justice Department everything it wanted when you said that "the government needs to protect citizens from a company with monopolistic powers that gouges people." Who gets to decide what is price gouging and what is fair—a government appointee? A competitor? You? The people who create a product are the only ones who should have the right to set its price. If we think it is too high, we are free to live without it. If we can't live without it, then no price they ask is really too high.

Deanna Davis
via the Internet

CD Confusion

IBOUGHT THE JULY ISSUE BECAUSE IT came with a CD-ROM. The words "De-bug your System 7.5 with Apple's latest release" on the CD jacket, superimposed on an image of a bunch of insects, implied that the update fixes a lot of bugs. When I opened the magazine, I could not find one single description of a bug that was fixed. However, I did see this caption on page 5: "Yeow! Apple ships conflict-ridden System Update 1.0 . . ."

So should I install 7.5.1 on my Performa 6115CD or not? I knew about the General Controls thing already and I don't use any of the applications that you published conflicts about, but what bugs, if any, are actually fixed?

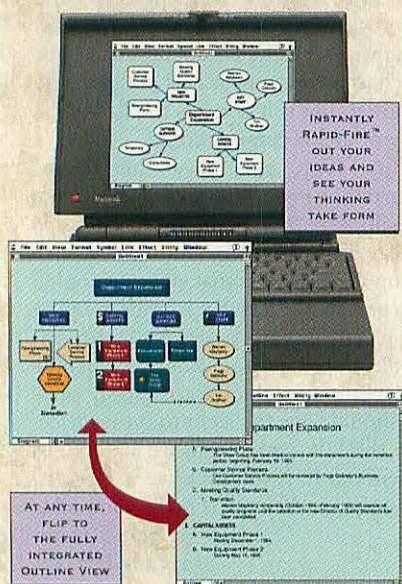
Josh Mayfield
via the Internet

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CORRECTIONS

■ The specific 24-bit accelerated video card included with Apple's \$4699 Power Mac 9500/120 ("First of a New Breed," August 1995) is the Xclaim GA, part of the mach64 family of cards from ATI Technologies.

■ DataViz sells Mac-to-PC null modem cables only to MacLinkPlus customers who need to replace lost or damaged cables (PowerBook Notes, August 1995).

■ Macworld Lab results for the PCI Power Macs were incorrectly calculated in the newsstand copies of the September 1995 issue. Refer to the results in this issue's "Power Mac: The Next Generation" feature instead.

System 7.5.1 fixes a number of problems—such as multisynchronous monitors forgetting start-up settings, scrambled video on AV models, and failing to recognize IDE drives—as well as adding functionality to the Mac OS. For a complete list of changes, go to [ftp://ftp.info.apple.com](http://ftp.info.apple.com) and download the System 7.5 Update file in the Software Updates folder of the Apple Support area.—Ed.

THE JULY NEWS ITEM "SYSTEM 7.5 Update Causes Conflicts" says, "Always install software with extensions off. If you are installing from a CD-ROM, use Extensions Manager to disable all extensions except those needed in the CD-ROM drive." Farther along I read, "If you have any Apple extensions or control panels that are either renamed or disabled by an extension manager, the Installer will not update them. The solution is to make sure all extensions have their original names, then enable them with your extension manager and reboot . . . before running the Installer."

I guess I'm not understanding; these two statements seem to contradict each other. I will be installing from a CD, so could you please clarify?

Chu Wong
via CompuServe

Happy to—if you've renamed any extensions or control panels, change the names back to the original and restart with all extensions on (this gets the extensions lined up in the order the Installer expects). Then restart again, this time with all extensions off (except the ones you need to run the CD-ROM drive). Now run the Installer. That way, the Installer will correctly update your System software.—Ed.

I'd Buy That for a Dollar

STRUGGLING WITH WORD 6 ONE afternoon at work, I explained to our copy editor that I had finally figured out

how to make big money in publishing: print up hundreds of thousands of bumper stickers that say: "Honk if You Hate Word 6."

"Please," she replied. "The world is noisy enough already."

Dorothy Rosa
via America Online

Go Nightingale

I WANTED TO TAKE ADVANTAGE OF the free demo mentioned in July's *Letters* regarding the music-notation program Nightingale. Although your editorial note says a free demo is available, CompuServe doesn't recognize Go Midibren. What's the story?

John Panning
via CompuServe

D'oh! I should've put Go Midibren. Once there, log on as a member and go to Library 15. The Nightingale 2.0 demo files are right there. Also, check out the Nightingale 2.0 review in this issue.—Ed.

Dissin' the Net

IN JULY'S "GETTING YOUR FEET WET on the Net" (*At Work* news), you state that "the downside of using an online service is that none currently provide access for Mac clients to the World Wide Web." This is simply not accurate information. CompuServe now offers a PPP connection for anyone with MacTCP installed. This allows you to choose between Netscape and Mosaic to surf the Net. You can also use other PPP-dependent programs like Homer. America Online has just released its version 2.6 with an external Web browser that works very well. Eventually the WWW browser will be integrated into its Mac client as AOL has already done with the Windows version. I think Prodigy has a browser, too. Even eWorld will have one this fall, and Microsoft Network has promised one by next summer.

The Internet is more than just the World Wide Web. Most of these online services also provide FTP and news-groups. CompuServe adds Telnet to that list. They all do it for a monthly base fee of about \$10. So before you dismiss the online services—know the facts.

Douglas Bergere
via eWorld

At the time that article was written, no service had a Web browser. The online services were, as a group, promising much and delivering little. The features "Make the Right Connection" and "Pick the Best

continues

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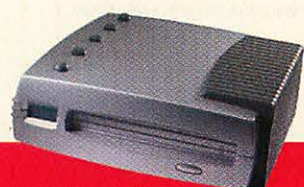
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Browser," in this issue of *Macworld*, rate stand-alone Web browsers, as well as the browsers recently added to commercial online services.—Ed.

A Crucial Compiler Slips

A CRUCIAL COMPILER SHIPS" MISSES the point with regard to Symantec (*Power Mac News*, July 1995).

Symantec abandoned Macintosh developers two years ago by not doing a PowerPC environment. Who knows why it reentered the game at this late date?

Its earlier compilers, Think C 6 and Think C 7, were late, slow, buggy, and lacked support from Symantec. The premier reference product, Think Reference, has been abandoned also. It has not had an update for more than a year, and really nothing new for almost two years. The database is filled with errors as well. The grapevine says Symantec might be bringing out a new version, but I am no longer interested.

By the way, the review of Symantec C++ 8.0 is less than candid, and somewhat biased toward Symantec (*Reviews*, July). CodeWarrior 6 has been out longer than the July issue of *Macworld*, yet you chose to compare C++ 8.0 to CodeWarrior 5.0. As for code size, CodeWarrior 6 produces smaller code than my earlier Think C (I optimize for code size in code resources). And no mention was made about online reference materials for C++ 8.0 (you know, Think Reference...?).

We need a critical assessment of Symantec as a player in the Macintosh world. If not for Metrowerks, Symantec might not be there, either.

Ken Kashmarek
via the Internet

Readers who want to experience the lively debate regarding C++ 8.0 and CodeWarrior can pop into the Usenet group `comp.sys.mac.programmer.tools`, or check out keyword **Mac Development** on America Online or **Go Developer** on CompuServe.—Ed.

Give Us a Break

THIS LETTER IS IN RESPONSE TO your response to Bart Stidham in the July 1995 *Letters*. Stidham correctly called you on the carpet for omitting a very fine freeware solution for "Meeting the E-Mail Challenge." Your response that the article was "aimed at corporate users interested in building large, complex E-mail networks" raises some very interesting questions. Help me out on this. Just what percentage of your readers are involved in building large, complex E-mail networks? Five? Ten? You don't

suppose that your magazine is only interested in promoting software that does, or could, lead to more advertising revenue? I suspect that the commercial providers would take a very dim view of, heaven forbid, a free solution.

Steven L. Bruning
via CompuServe

Most people are glad that *Macworld* manages to cover diverse topics for a variety of readers. In this instance the focus was on corporate users; February's "Small-Office Blueprint" was aimed entirely at the small- or home-office reader. We also regularly cover shareware solutions in our pages, particularly in *The Desktop Critic*.—Ed.

Three-Book Monte

I'VE NEVER MET DEKE MCCLELLAND, but I'm a big fan of his books and reviews. For example, I bought his *Macworld Photoshop 2.5 Bible*. When I upgraded to Photoshop 3, I also upgraded to the *Photoshop 3 Bible*, second edition.

In the July 1995 issue of *Macworld*, *New Products* extols the virtues of *Photoshop 3 For Mac For Dummies*. Just below this text is a half-page ad for the *Photoshop 2.5 Bible*. The ad is headlined, "At Last! The Definitive Reference to Image Editing with Adobe Photoshop 2.5." At last! Please. I've had my copy for over a year.

Why not an honest ad that lays it all out? You need a book about 2.5 because you have no intention (for some strange reason) of shelling out a lousy \$149 for the upgrade to 3? IDG has it. You've upgraded to or just bought 3? Fine, IDG has your book, too. And if you really want your hand held, IDG will even sell you the Dummies version of the thing.

I rely on *Macworld* so I can make informed decisions when I'm ready to buy. For your publication (by running the ad) and the book's publisher (by placing the ad) to attempt to mislead readers into thinking that 2.5 is the latest Photoshop book by McClelland is a serious breach of faith.

Robert W. Simon
via America Online

Letters should be sent to Letters, *Macworld*, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld1), or via the Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. **m**

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ART DIRECTORS

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MacBulletin

Apple's Changing Clone Plans

In ongoing refinement of its plans to support the Mac OS on clones and the joint Apple/IBM/Motorola Common Hardware Reference Platform (CHRP), Apple has now decided to port System 7.5 to CHRP by the end of 1996, according to Jim Gable, Apple's CHRP licensing director. The first CHRP-based systems should ship from IBM and others in 1996. Previously, Apple said it would port only the next major Mac OS, code-named Copland, to CHRP and cited the extra work needed to port Copland as a reason for that OS's delay until late 1996 or early 1997 from its original early-1996 target release.

DayStar Clone Targets High End

DayStar Digital (404/967-2077) has set the initial configuration for its Genesis MP publishing-oriented Power Mac clone, which should be available in small volumes in September 1995. The unit will come equipped with four 132MHz PowerPC 604 CPUs with a 512K cache, 32MB of RAM (expandable to 1.5GB), a 2GB SCSI-2 Fast hard drive, ten expansion bays, six PCI slots, and a quad-speed CD-ROM drive (see "Tantalizing Potential of Four CPUs," *Power Mac News*, September 1995). It will be priced under \$15,000. The clone will ship with a multiprocessor extension for Adobe Photoshop, and DayStar is working with other software developers to develop multiprocessor extensions for their applications. DayStar expects these extensions to trickle in between September and January.

Power Computing Drops Prices

Right before Apple announced the PCI Power Macintoshes (see "Power Mac: The Next Generation," in this issue), Power Computing (512/258-1350) dropped the price of its NuBus-based Power 100 system, which offers a 100MHz PowerPC 601 CPU, 8MB of RAM, a 365MB hard drive, and built-in video and Ethernet. A base

model Power 100 now costs \$1699, down from \$2399.

Apple Fails to Meet Demand

Apple Computer's quarterly profits in the quarter ending June 30 fell about 25 percent, despite a 20 percent rise in Mac sales. The problem was that demand for Macs exceeded what Apple could deliver, making many financial analysts doubt the company's ability to forecast demand and manage production to keep up. Apple chief financial officer Joseph Graziano attributed the shortfall to shortages in key components like chips, and said that the company may not be able to meet demand until sometime in 1996—despite Apple CEO Michael Spindler's goal this winter to make better forecasting and delivery a priority for 1995. One result of the tight Mac availability has been a decrease in Apple's share of the overall PC market to about 8.5 percent, down from about 9.5 percent a year earlier.

2 Million Power Macs

Shipments of Power Macs more than doubled compared with those in the same quarter a year ago. As of June 30, there were more than 2 million Power Macs and upgrade cards sold in the 15 months since they were first released. Apple's goal had been 1 million Power Mac sales in the first 12 months, a goal it reached in about 10 months. Apple's last 680X0-based Mac will probably ship by the end of 1995; the company has already replaced most of its 680X0-based business, consumer, server, and education lines with PowerPC models.

La Cie Sold to French Firm

Hard drive maker La Cie, an eight-year-old Mac company acquired by Quantum in 1991, is now owned by Electronique d2, Europe's largest seller of external storage products. The Paris-based d2 sells storage options for the Mac, PC, and workstation markets. The company intends to keep the La Cie brand. [m](#)

News

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System 7.5.2 Fixes



Although System 7.5.2 (which ships with the new PCI Power Macs) looks and feels much the same as System 7.5, Apple (408/996-1010) has made some heavy-duty changes under the hood for greater performance on the new models.

But the new system brings with it some conflicts with hardware and other software. The conflicts identified here occur with the Power Macintosh 9500; it's possible that not all will occur with the other PCI Power Macs (whose final versions shipped just as this issue went to press).

Hardware Conflicts The screen may flash or black out momentarily during start-up. This happens when the Mac OS loads its Display Manager software into memory, according to Apple, but the flash does nothing harmful. Although the problem appears to occur when you're using the video card that's included with the 9500/120, it doesn't happen with ATI Technologies' separately sold Xclaim GA card. ATI makes both cards, but the company says that the ROMs are different and that may account for the screen flash.



Apple's LaserWriter 300 and Personal LaserWriter LS printers aren't compatible with System 7.5.2. Apple is developing new printer drivers. The Hewlett-Packard 550c ink-jet printer (800/752-0900) works only via a LocalTalk cable connected to the printer port; you cannot use a standard serial cable with the HP printer.

Software Conflicts The conflicts are listed here alphabetically by company.

- The SpeedBoost module in Aladdin Systems' Desktop Tools software doesn't

support System 7.5.2's Finder. Aladdin Systems (408/761-6200) is working on an update.

- Apple's GeoPort telecommunications software does not work if a LocalTalk network connection is active. Apple (408/996-1010) promises a compatible update (version 2.1) this fall.

- Apple's Newton Toolkit versions 1.0.1 and 1.5.1 are not compatible. Apple is testing a software fix.

- Apple has released an Open Transport 1.0.1 patch to fix a problem with Apple's

TCP/IP protocol, which results in truncated data in some situations and a possible crash after the completion of automatic connections with some Link Access Protocols, such as MacPPP and MacSlip.

- Caere's OmniPage 5.0 and OmniPage Professional 5.0 crash when you try to use the Save As function on a scanned document. According to Caere, the problem is caused by the program's translation filters. Caere has released a new set of filters addressing this conflict. Registered us-

ers of these programs can get new translation filters from Caere (408/395-8319).

- Casady & Greene (408/484-9228) has released Conflict Catcher 3.0.2, which includes support for the new PCI Power Macs. One significant fix lets the program recognize the ATI Graphics Accelerator system extension, which activates accelerated video for Apple's video card or for ATI's Xclaim GA. The update is free to registered users of earlier versions of Conflict Catcher 3.

- When you try to launch current versions of CompuServe Information Manager, you get a message that there's not enough memory. The solution for now is to open the Memory control panel, turn off the Modern Memory Manager, and restart. Turning off this feature may reduce performance, so it's a good idea to use it only when you want to run a CompuServe session. CompuServe programmers are reportedly working on a solution, although the company (614/529-1340) would not confirm this.

- Connectix (415/571-5100) reports that the current versions of Maxima and RAM Doubler RAM utilities do not support the PowerPC 604 chip; an update is expected by the time this issue appears.

- Dantz Development (510/571-5100) has issued an update for Retrospect 2.1 for Power Macintosh. The update, available on the major online services, adds support for the PCI Power Macs and for start-up drives larger than 2GB.

- Dubl-Click Software (503/317-0355) is investigating reports that its ClickChange software freezes on start-up.

- Users of Global Village's PowerPort Gold II modem need to upgrade to version 2.5.5 of the GlobalFax software. The update from any 2.5.X version is available in the company's support areas on the major online services or at its Web site (<http://www.globalvillage.com>). Users of earlier versions of Global Village's software should contact Global Village (408/523-1050) about upgrade pricing.

- Macromedia FreeHand

SPECIAL REPORT

Apple said it couldn't be done, but a small Swiss firm has ported the Mac OS to IBM's PowerPC platform. This brings the Mac OS a big step closer to broad availability and cloning. *Macworld's* exclusive report begins on page 38.

5.0 fails to load all Xtra (plugin) modules when users launch the program. Macromedia (415/252-2000) is looking for a solution to this problem.

- Now Utilities 5's Super-Boomerang component does not display a direct open submenu (the submenu that appears adjacent to the Open command in the File menu). And the Startup Manager component prevents the ATI Graphics Accelerator system extension from loading. A temporary solution is to rename the Graphics Accelerator extension so it loads ahead of the Now Toolbox extension in the System Folder's Extensions folder (insert an option-space at the beginning of the Graphics Accelerator extension's name). Now Software (502/274-2800) plans to release an update for these programs.

- Some third-party XTensions (plug-ins) for QuarkXPress for Power Mac may make the program freeze up when the application launches. According to Quark (303/898-8888), the conflict involves an undocumented change to the network programming interface in Apple's Open Transport architecture. By the time you read this article, the company's 3.32

revision should be available via major online services and should fix the problem.

- Symantec (310/453-4600) reports that version 4 of Symantec Antivirus for Macintosh (SAM) and the Copy-Doubler component of Disk-Doubler Pro do not run. In addition, MacTools Pro 4 and Norton Utilities 3 do not support disk volumes larger than 4GB; the new Power Macs do support larger volumes. Symantec expects to have fixes available by the time you read this.

PCI Performance Anomaly
Unrelated to System 7.5.2 but of concern to buyers of the new Power Mac 9500 is the fact that cards in the 9500's top three PCI slots may run more slowly than cards in the bottom three slots. The PCI slot requires one controller for every three slots and a bridge chip for each pair of controllers; Apple's PCI design apparently causes more overhead on one set of slots than on the other.—GENE STEINBERG

Bye-Bye, Floppy Drive?

THREE TECHNOLOGIES VIE TO SUPPLANT THE FLOPPY

omega's new Zip drive, which uses 100MB removable cartridges about the size of 3.5-inch floppies, has revived yearnings for what until now seemed like an impossible dream: replacement of the *continues*



High-capacity, low-cost drives may supplant the floppy drive.

Publishers Invest in Netscape

Five media giants—International Data Group (*Macworld's* parent company), Times Mirror, Hearst, Knight-Ridder, and TCI Technology Ventures—as well as Adobe Systems have invested \$2 million each in Netscape Communications, whose Navigator Internet browser is a de facto standard. The companies plan to work with Netscape in developing electronic publishing tools that are based on the Navigator technology.

More PCI Cards Ship

Adaptive Solutions (503/690-1236) has released its PowerShop Photoshop accelerator, which costs about \$3000. Silicon Valley Bus (408/623-2300) is shipping the \$249 Multi-Port/PCI, which adds two PC-style serial ports, one parallel port, and one game port; an extension that enables the Mac to see these ports; and GDT Softworks' PowerPrint software, which lets the Mac work with PC printers. The ports work with Macintosh and Windows programs running on a PC card or under emulation in SoftWindows.

Apple, IBM Offer Multimedia Tools

Another effort in the Apple-IBM partnership that produced the PowerPC has begun to result in tangible product. Kaleida Labs (415/335-2098)—a jointly sponsored company—has shown its ScriptX multimedia authoring tools and programming environment. ScriptX lets developers create animations, such as games, that play on Macintosh, Windows, and OS/2 PCs. The graphical language lets developers add components from a disk, a server, or even the Internet, through simple file import, as well as modify characteristics of elements by selecting them and changing parameters in dialog boxes.

THE AMCoEX INDEX OF USED MACINTOSH PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 140/4MB/40MB	\$600	-\$25
PowerBook 165/4MB/80MB	\$1025	-\$25
PowerBook 180/4MB/80MB	\$1300	-\$25
PowerBook Duo 230/4MB/80MB	\$750	\$0
Mac IIsi/3MB/40MB	\$275	-\$75
Mac IIci/4MB/80MB	\$500	-\$150
Mac IIx/4MB/80MB	\$475	-\$150
Centris 650/8MB/230MB	\$1075	-\$100
Quadra 800/8MB/230MB	\$1275	-\$400
Quadra 900/8MB/160MB	\$1075	-\$100
Power Mac 7100/66/8MB/350MB	\$2000	-\$250
Power Mac 8100AV/8MB/500MB/CD	\$3100	-\$50

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during week of July 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

standard 1.4MB floppy with a small, inexpensive, rewritable, widely compatible storage product that offers capacity more in line with today's computing needs.

Unfortunately, attractive though the new Zip and SyQuest products may be, they don't offer read-write compatibility with 1.4MB floppies (let alone with each other).

Now Compaq, 3M, and Matsushita Kotobuki have joined to introduce a 120MB floppy. The new drive reads and writes 1.4MB and 720K floppy disks (but will need enhancements to read and write 800K Mac disks). Compaq will have short-term exclusive rights to the drive when it's introduced later this year. The new drive stores data in magnetic form, but uses laser-guided track positioning to achieve such high data density. Data-transfer rates should exceed those of a normal floppy by a factor of five, but overall performance won't approach normal hard-drive speeds.

The three companies hope to avoid the failures of previous attempts to increase the storage capacity of the standard floppy: IBM briefly sold a 2.88MB floppy; Apple even supported 2.88MB drives in the Quadra ROMs, but never delivered the drives because a mere doubling of capacity didn't justify the chaos that would result from another floppy format.

CD-ROM drives are replacing floppies in limited ways, such as for software distribution. Microsoft Office, for example, comes on 33 floppy disks or just one CD-ROM. But CD-ROM is read-only, and CD-Recordable (CD-R) discs can be written to only once—good for archiving but not for general storage. CD-Rewritable (CD-RW), an erasable CD format, won't be available for about two more years, and even then erasable CDs will experience compatibility problems with standard CD-ROM drives.

Insite Peripherals made a valiant effort three years ago with its 21MB floptical drive that could read from and write to 1.4MB floppies, and the company pioneered laser-guided track positioning. Several vendors have offered flopticals for the Mac, but at a mere 19.2MB formatted capacity and much higher cost than floppy drives and disks, the floptical just couldn't compete with SyQuest cartridges and other removable media.

So pricing for the new drive will be critical; the Compaq-3M-Matsushita group estimates a price of \$200 for the drive and well under \$20 per disk. Unfortunately, this price is probably not low enough to make the 120MB drive a credible replacement for standard floppy drives, which cost PC vendors \$25 to \$35.—CARY LU

Faster 680X0 Emulation

UTILITY RUNS OLDER
PROGRAMS FASTER ON
POWER MACS



To make the transition to PowerPC successful, Apple had to ensure that all the 680X0 Mac software ran on the new Power Macs. And Apple did. But 680X0 software runs slowly—at about IIci to Centris 610 speeds on most Power Macs, particularly for I/O operations like disk access.

The new PCI-based Power Macs—the 7200, 7500, 8500, and 9500—use a new form of 680X0 emulation, called dynamic recompilation, that is faster than the previous Power Macs' emulation. But the dynamic emulator doesn't work on older Power Macs.

So are you stuck with slow 680X0 emulation? No, thanks

an 8100/80's built-in emulator. In fact, with SpeedDoubler, an 8100/80 ran 680X0 programs as fast as a 120MHz Power Mac 9500 does, even though that Mac has a faster CPU and uses the new, faster dynamic emulator.

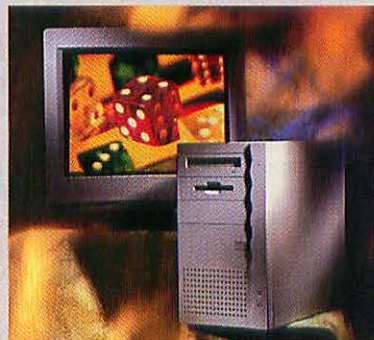
SpeedDoubler does impose a penalty for floating-point-intensive calculations, running them 25 percent slower on an 8100/80 than the 8100/80's emulator. But the more common integer calculations were almost twice as fast with SpeedDoubler.

Connectix says SpeedDoubler also makes the new PCI Power Macs faster, even with their dynamic emulator, and Macworld Lab tests show a 10 to 15 percent speedup.

SpeedDoubler gets its speed by substituting its emulator for the Power Mac's built-in emulator and by using its own disk caching rather than Apple's. You can set the disk cache as high as 2MB—which is a lot of RAM to give up—and get an additional 10 percent performance boost,

Radius Ships New Clone

Radius (408/541-6100) has begun shipping its mass-market Power Mac clones (see *News*, September 1995). The 110MHz PowerPC 601-based 81/110 tower systems have list prices that start at about \$5600 and include 16MB of RAM, a 2GB hard drive, a quad-speed CD-ROM drive, and a mouse. Radius expects the street price to be about \$4800. Catalog seller MacWarehouse (800/905-9279) is also selling the systems under its Power User brand, starting at \$4499.



to Connectix's latest effort. The \$99 SpeedDoubler (415/571-5100), due to ship about when this article appears, significantly improves the performance of 680X0 programs on a Power Mac, according to Macworld Lab tests of a late prototype. The tests on an 8100/80 found that SpeedDoubler ran 680X0 programs 37 percent faster overall than

Macworld Lab found.

In its early tests, Macworld Lab found no incompatibilities although Connectix says it is working to correct some that it found before the program ships. SpeedDoubler will work with Connectix's popular RAM Doubler as long as you use version 1.5.2 of the memory booster.—DANNY LEE AND GALEN GRUMAN

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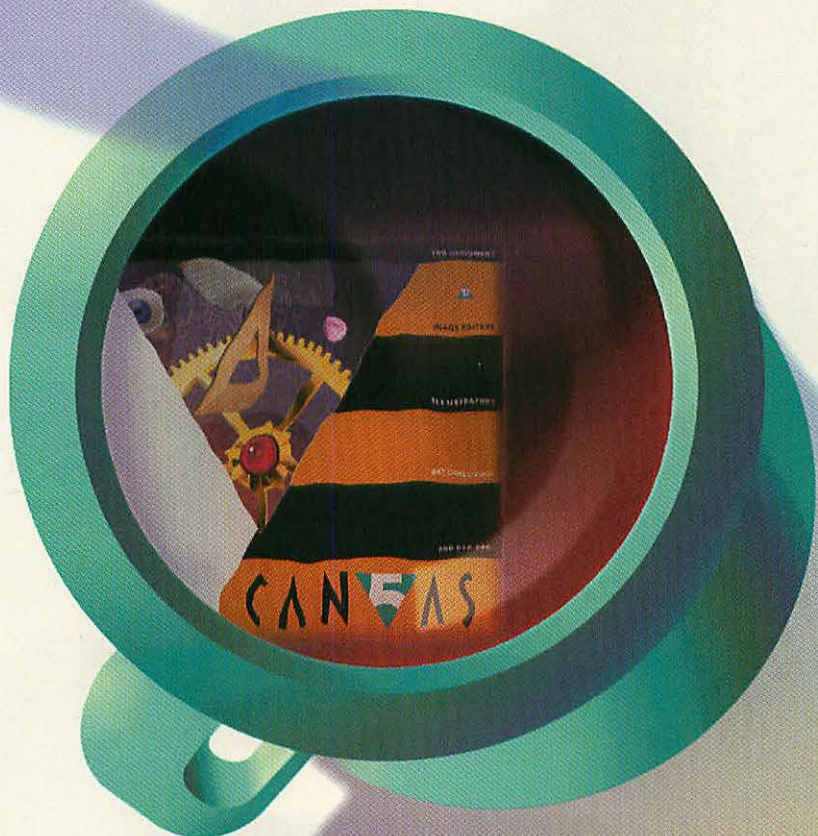
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Circle 57 on reader service card

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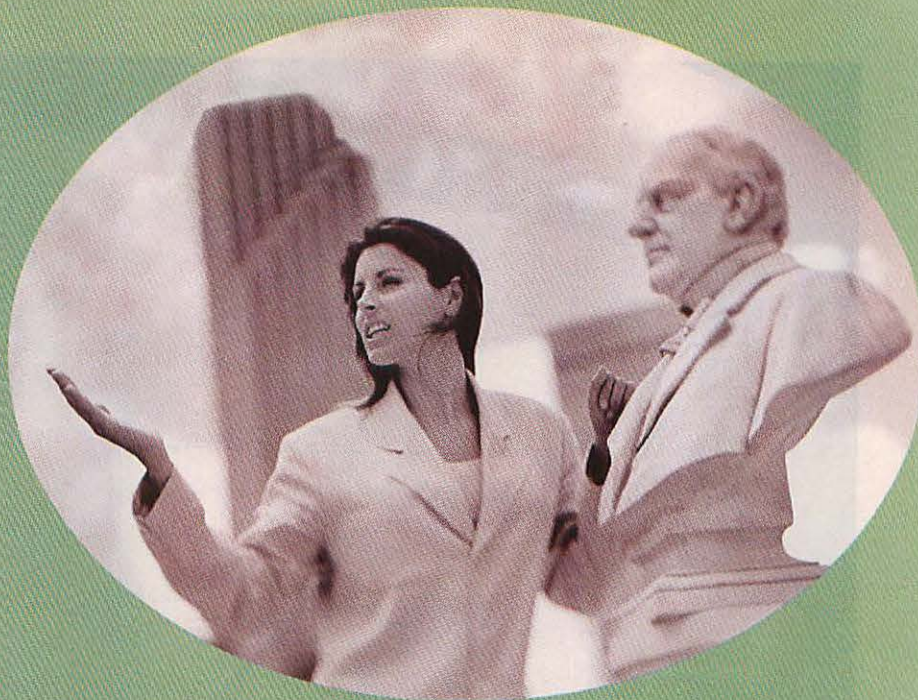
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And an idea.



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Tools for creating content.

Tools for creating a look.

Tools for creating graphs.

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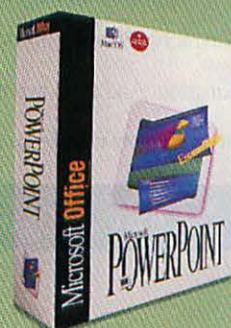
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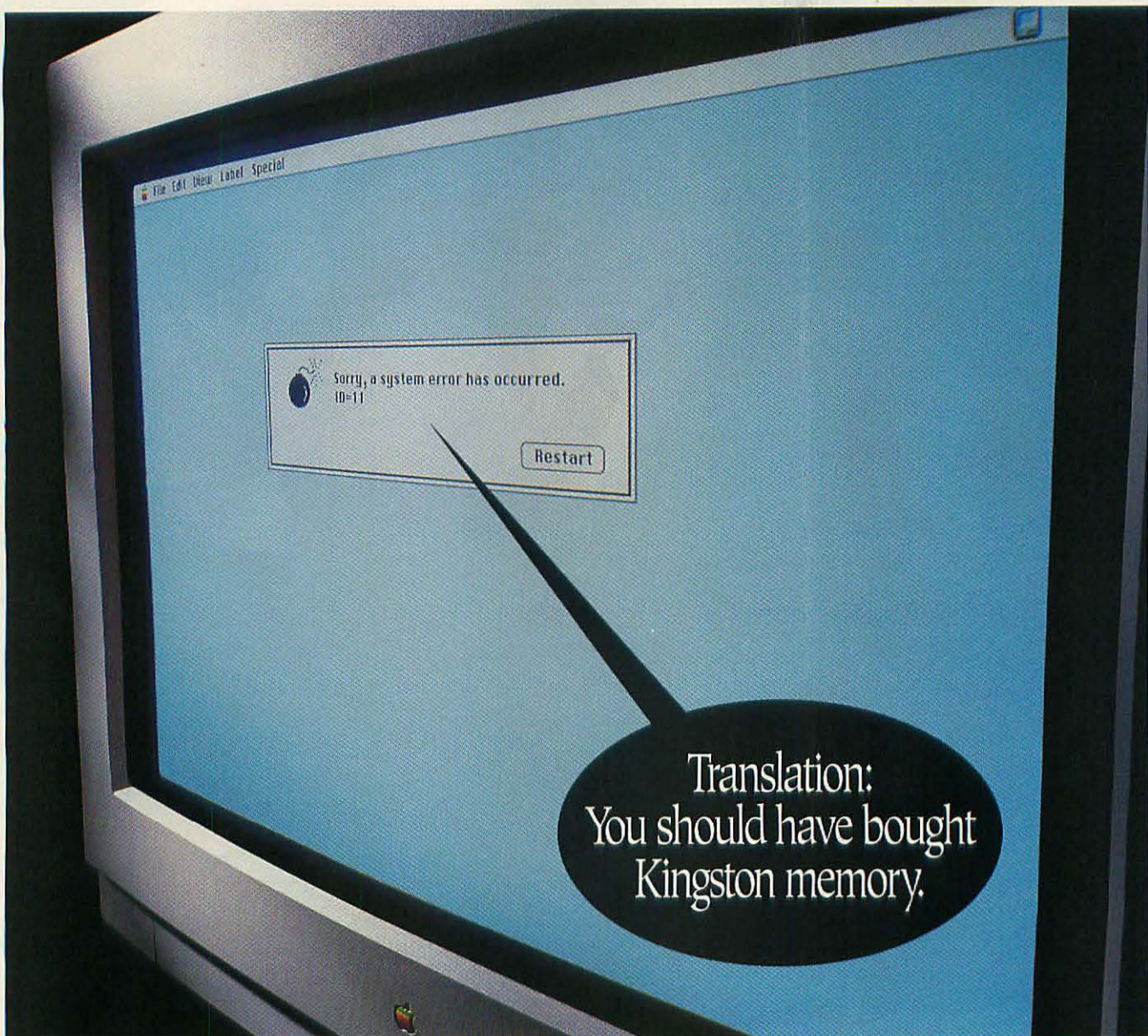
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CD Titles on the Wane

THE MARKET MAY HAVE ALREADY PEAKED

It seems like only yesterday that CD-ROM drives became common in desktop computers. By many measures, the CD-ROM market is robust, with rapid growth in the number of CD-ROM drives and discs sold. But in one important measure—the number of new CD-ROM titles published per year—the CD-ROM publishing business may have already peaked. The 1200 new consumer CD-ROM titles released in 1994 (as counted by market research firm InfoTech) may never be surpassed.

Only a few hundred CD-ROM titles can find shelf space, even in the biggest computer stores. Some bookstores that started carrying CD-ROMs last year have now given up, citing the inability to demonstrate discs to potential customers and the high return rate.

Why a high return rate with all the enthusiasm surrounding CD-ROMs? Because customers often find little real value in discs once they use them, and technical problems with DOS and Windows discs are common. Bookstores that do carry CDs typically have space for only a few dozen titles.

Some mass merchandisers such as Target and Wal-Mart have begun carrying CDs—but only the hit titles. The successful CDs stay on the shelves, squeezing out the new titles.

Also, competition has driven down CD prices at a time when the cost of developing a competitive title has grown rapidly, as customers demand more video, audio, and expensive-to-produce interactive content. The market-research firm Dataquest reports that the average selling price has dropped to \$11 per CD; that figure includes



discs bundled with drives, which account for about two-thirds of all discs sold.

As a result, many CD-ROM publishers cannot find a way to sell their titles and may not survive till Christmas, the main selling season. Several large book publishers are cutting back their CD-

ROM development efforts; Putnam New Media has already closed.

Online services, particularly the Internet, have begun replacing the need for some CD-ROM titles, such as frequently updated reference material. And computer enthusiasts who might have bought a CD for entertainment or information a year ago may now prefer to cruise the World Wide Web and other online services. That's why the CDs that seem to survive the crush are mainly games, interactive explorations, or how-to's—the kind of material that online services can't deliver effectively.—CARY LU

BUGS & TURKEYS



Users of Adobe Photoshop 3.0 and Microsoft Word 6.0 have reported crashes with version 1.01 of Bit Jugglers' Underware screen saver when password protection is activated. Bit Jugglers says version 2.0 fixes the problems. Users can buy the upgrade for \$19.95 by calling 415/968-3908.



Multi-Ad Creator 3.7, a display-ad layout program, prints halftone screens at 133 lines on some laser printers—a big problem, since the maximum line count for newsprint and web presses is 85 lines. The company says the Hewlett-Packard LaserJet 4MV and the Apple LaserWriter 16/600, and possibly others as well, produce the 133-line screens. Affected users can call Multi-Ad Services at 309/692-1530 for a free update disk.



So you paid almost two grand for Visual Business Systems' PostScript image rasterizer program. But did you know you also paid for the loss of your modem serial port? A security dongle for the product works best when it's plugged into the Mac's modem serial port; users not only have to unplug their modems, they also have to remove any fax or modem software from the System Folder. The company (508/263-9900) says it is working on an ADB version of the dongle and also a new software-based encryption method.



Trying to upgrade your U.S. Robotics Courier modem from V.Fast to V.34? Better get a PC or Soft-Windows. The software to upgrade the flash ROMs doesn't work on a Mac. U.S. Robotics (708/982-5001) says a Mac version is forthcoming.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld*.

In Brief

Lotus Notes for Power Macs

Apple Computer and Lotus Development have agreed to provide a CD-ROM containing the Lotus Notes client software to anyone who buys a Power Mac after June 19. Using the client requires having a Notes server (which runs only on Windows, NetWare, OS/2, and Unix workstations). To get the free CD-ROM, call 800/346-1305.

Infrared Connections

Farallon Computing (510/814-5100) has begun shipping a \$70 infrared communications pod that attaches to desktop Macs and PowerBooks that have a free serial port (it also uses the ADB port for power, but has a pass-through connector). With the AirDock, you can transmit files between Macs at the same speed as over a LocalTalk wired network. The AirDock has a 6-foot range.

Apple Revises eWorld

The new eWorld 1.1 software from Apple (408/996-1010) adds support for Internet Usenet groups and FTP servers, as well as full access to the World Wide Web. Other enhancements include automated message filtering for E-mail and improved display of movie clips and color images. The new software is one of several efforts to help the eWorld service, which launched in spring 1994, get past a relatively low 100,000-subscriber base. (America Online has about 3 million subscribers and CompuServe about 3.2 million.) Other efforts include moving 12,000 Apple employees from the company's AppleLink service to eWorld this summer, soliciting the other 40,000 AppleLink users (mainly product developers) to move to eWorld by year's end, and the planned distribution this fall of a Windows version of the eWorld software—but all three actions are about a year later than originally planned.

Apple Says No to IBM's Macintosh

BY CHARLES PILLER

Apple, with its famously vast R&D budget and crack engineering team, said it couldn't be done. Yet a tiny, independent company of six Swiss engineers—led by its 24-year-old president, the gray-beard of the group—has accomplished the impossible. They have moved the Macintosh Operating System to IBM's PowerPC Reference Platform (PReP), Big Blue's standard design for its current generation of PowerPC-based computers.

In less than six months, little-known Quix Computerware, based outside Zurich, managed to get much of the Mac OS to operate on PReP. Macworld Lab tested dozens of unmodified Mac applications for performance and compatibility when running with the Quix system on prerelease PReP computers supplied by FirePower Systems and Motorola.

The results were surprising for any early prototype—and stunning for a prototype of an altered OS running on prototype hardware: near flawless compatibility, and performance at the level of equivalent Apple Power Mac models (see the results in "Quix's Mac Port Measures Up to Apple's Macs." We also found similar results in spot tests with an IBM prototype.)

More than a year ago, IBM tried to get Apple to agree to port the Mac OS to PReP, which IBM designed as a PowerPC-based standard to compete against Intel-based PCs. IBM wanted a mass-market OS for inexpensive PReP PCs that can run workstation OS's and are built from industry-standard parts rather than the specialized chips (such as the ROMs) of Apple's current hardware design. Such a combination could provide a fast track to a major Mac-clone

market, IBM reasoned.

But Apple rejected the offer. "It would take us about two years to port [the Mac OS] to PReP," said Don Strickland, Apple's then vice president for licensing, last September. "It would require us to literally turn our software developer base over. We can't do that in the next two to three years."

So how could a handful of whiz kids do what a computer-industry giant would not even attempt? Ironically, part of the answer is experience. The company previously ported the Mac OS to the Next platform, and was granted a license by Apple for that product. "We had a huge amount of know-how from the Next port," says Andy Grawehr, president of Quix. "There wasn't a lot of experimentation for the PReP port." Grawehr says a finished product could be delivered as early as November.

But to sell such a product, Quix needs Apple's permission, and Apple so far refuses to give it. If Apple were to support the effort and Quix were to finish its product successfully—both big ifs—the development could have profound implications for the emerging Mac-clone market and could aid Apple's ability to compete in the OS wars.

"We believe that the Quix product has potential and that



FirePower Systems' PReP box: looks and feels like a Mac.

it demands further evaluation," Gary Griffiths, director of business development for IBM's Power Personal Systems division, tells *Macworld*. IBM is not interested in building a straight Mac clone, such as those being produced by current Mac OS licensees, he adds (see the sidebar "IBM Holds Off on Mac OS"). "But if Quix provided an earlier path for running the Mac OS on an industry-standard platform, we would be very interested."

Pieter Hartsook, a leading Macintosh analyst, sees the Mac OS running on PReP as offering a potentially significant advantage for Apple's competitive position against Windows 95 and Windows NT before next year's planned release of the Common Hardware Reference Platform (CHRP), a system under development by Apple, IBM, and Motorola that extends the PReP design to include Mac-specific technology and that eventually will replace both PReP and the current Power Macintosh hardware design.

Behind Apple's Rejection

So far, however, Apple has shunned Quix. Jim Gable, Apple's licensing director responsible for the transition to CHRP, hand-delivered a letter to Grawehr, dated July 11, rejecting the Quix request for an OS license. While Gable would not discuss the Quix situation with *Macworld*, his letter cites several reasons.

- "Fundamentally, we want to keep the Apple, IBM, and Motorola alliance focused on the common platform [CHRP]," Gable wrote.

- Apple considers Quix too small to be a reliable partner and doubts that the Quix product can be successfully completed without "trade-offs" that fall short of adequate compatibility.

- Gable also indicated that "if this product succeeds, even in small volumes, we will have strong demand from end customers and IBM to follow with a Copland version of Quix also. This is a significant addition to the Copland effort."

- Apple doubts that Quix could provide adequate cus-

tomers support, Gable says.

Gable ended the letter with a complimentary note, however. "We admire your abilities and enthusiasm, and would like to continue conversations with you about ways Quix could assist us in other PowerPC efforts, such as CHRP," he wrote. Gable then tried to recruit the Quix engineers for jobs on Apple's OS development team, Grawehr says.

In late July, after hearing of the *Macworld* investigation, Gable told *Macworld* that Apple is still engaged in discussions with Quix and "is talking to our partners" about the situation. He would not comment further. Grawehr says that Gable has "reluctantly" reopened negotiation with Quix at IBM's request.

Apple Won't Test An authoritative source within Apple agreed to explain Apple's position without being identified. "The Quix demo is a great demo," the Apple source said, "but they've hacked together stuff in unique combinations, and not tested in a wide variety of conditions like an Apple product would be. How easy or hard would it be to get from this cool demo to a cool product? It could be very hard. [Apple engineers] have talked to the engineers at Quix, and it turns their hair white to talk about it," the source added.

Grawehr calls such characterizations untrue and naive, pointing out that no one at

Apple has yet evaluated the Quix product beyond a brief demonstration. But *Macworld* Lab has, and its testing confirms that the product is stable and reliable in the OS functions it so far supports. And despite repeated requests, Apple has refused to give Quix a list of specific compatibility requirements that the product must achieve for Apple to support the development effort.

Lamar Potts, Apple vice president for licensing, declines to comment about the Quix situation, in keeping with company policy not to discuss licensing negotiations. He adds that Apple would not publicly release its compatibility requirements until the CHRP specification is finalized, an effort that is several months behind schedule and now due by the end of this year, according to Gable. Potts declines to say whether Apple would consider a PReP clone effort if a suitable port emerged—regardless of who creates it.

Death by Neglect Apple's resistance may kill the Quix project before it's born. "Time is of the essence. If we're going to do anything about this, we've got to do it quickly," says Griffiths. "We absolutely want an in-depth technical review between IBM, Apple, and Quix to determine what work would need to be done, in both product development and certification.

And we would be open to broader participation by some of the other companies that have adopted the PReP architecture."

The Experts' View

It's difficult to predict the results of the technical review Griffiths proposes. *Macworld* Lab's experience was auspicious, but as the old programming joke goes, the first 80 percent of the code requires 60 percent of the effort, and the last 20 percent of the code requires the other 60 percent of the effort.

Confidence in Compatibility Still, some architects of the Power Mac, PReP, and CHRP see no reason to expect show-stoppers—fatal design flaws—in the Quix project. Jon Fitch, until recently a leader of Apple's Power Mac and CHRP design teams, and now director of hardware engineering at Mac-clone maker Power Computing, says that Apple considered this port to PReP but didn't feel the effort was a high enough priority to justify taking on the significant engineering challenge. But he sees no technical obstacles to completing the project. He points out that the Mac OS already runs on top of three Unix variants, as well as on the Amiga platform and on Quix's port to Next.

"I have no doubt that the Quix product is the real thing," says Glen Miranker, vice president for hardware engineering at FirePower Systems and a member of the CHRP definition committee. He has had a detailed look at the Quix product. "I can't imagine that there is any real compatibility risk for a professional or corporate user," he says. "Maybe someone with some very old and weird applications might have some trouble." Miranker is so optimistic about Quix that FirePower would help underwrite

quality-assurance testing.

Miranker and Rick Oehler, director of system software and system development at IBM, concur that the Mac OS services yet to be ported to PReP—including support for PCI, timing, networking, peripheral devices, and sound—will require considerable effort, but in most cases straightforward solutions can be found. Ethernet, for example, should be relatively easy to port because add-on cards are readily available for this industry-standard network protocol.

A Few Sloppy Programs

According to Oehler, the biggest compatibility problems



Andy Grawehr, Quix president

may arise in the small percentage of applications that are coded directly to Apple's application-specific integrated circuits (ASICs) rather than to the operating system, which is supposed to mediate between the ASICs and the application software. But it's better to clean up those relatively few applications—"sloppy coding" that doesn't adhere to Apple guidelines—than to build the OS to handle this problem, he adds.

Oehler notes that when the Mac OS went from 24 bits to 32 bits, and when the Mac went from 680X0-series CPUs to PowerPC, Apple created opportunities for software developers to remove such hardware dependencies from their code, and most did so. "Any [developer] that is worried about the portability of their code would get this right—certainly all the major players would." *Macworld continues*



Whiz Kid Brain Trust

Quix engineers from left to right: Christoph Villiger, Christian Caduff, Stefan Müller, Oliver Strässle, Adrian Bucher, Simon Schubiger, Andy Grawehr.



Quix's Mac Port Measures Up to Apple's Macs

To test this prototype port of the Mac OS to IBM's PowerPC Reference Platform (PReP) system design, we concentrated on two key questions: Can the system handle a wide range of essential Macintosh applications smoothly and reliably? If so, is the performance of those applications fast enough to compete with equivalent Power Macs from Apple?

In each case, the answer was a resounding yes. We noticed a few irregularities with software testing, but bear in mind that the Quix software

was running on early prototype hardware, and that some operating-system functions were not fully implemented in the version tested. Final software and hardware should eliminate those few bugs we detected, as well as improve performance. Even so, the PReP-based machines (shown in bold) running on the Quix software performed at or near the level of an Apple Mac with equivalent cache, CPU speed, and hard drive.

As Fast as Apple Hardware

Boldface indicates PReP/Quix systems.

■ = Best result in test. Longer bars are better.

Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are in decreasing order of overall performance.

Overall Score

Shows typical performance in a mixed-use environment, such as a company or school.

CPU-Intensive

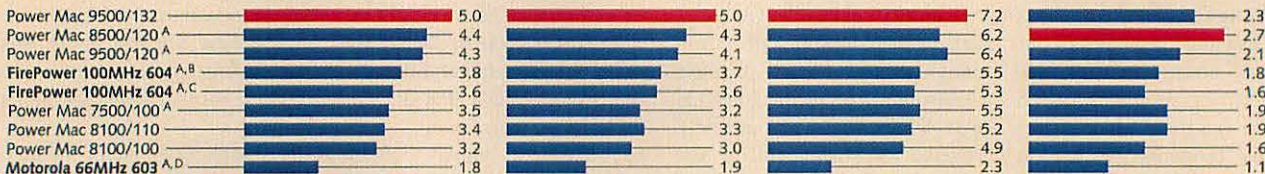
Shows performance for most business and personal tasks.

FPU-Intensive

Shows performance for analytical, 3-D, and other specialized uses.

Disk-Intensive

Shows performance of the Mac's data-transfer capability, which affects all users.



^A Prerelease unit. ^B Using 1GB Seagate ST32430 drive from Power Mac 9500. ^C Using 500MB Seagate STN5660N drive. ^D No cache. Power Mac 9500 and 8500 models have 512K cache; all other units include 256K cache.

BEHIND OUR TESTS

Macworld Lab tested several functions in eight key programs plus the Finder to determine real-world performance for the areas faced by most users: basic processing (the CPU-Intensive score), math processing ability for specialized applications like modeling and data analysis (the FPU-Intensive score), and hard drive performance (the Disk-Intensive score).

We then averaged the results (giving the CPU-intensive score 60 percent of the weight) to derive the overall performance, which gives an accurate measure for most business users of their Mac's performance. Due to rounding, some insignificant differences in various results are not reflected

in the overall scores. These results may be compared to the benchmarks of Mac systems and upgrades in the January 1995 and later issues. We tested native PowerPC versions of all software, which included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0.1, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.2.2. All systems tested had at least 24MB of RAM and were run with 8-bit color on 17-inch monitors.—**Macworld Lab testing supervised by Mark Hurlow, Danny Lee, and Tim Warner**

Excellent Software Compatibility

Software found to be compatible with prototype Quix software running on prototype PReP hardware

Adobe Illustrator 5.5
Adobe PageMaker 5.0a
Adobe Photoshop 3.0.1
Adobe Premiere 4.0
Adobe Type Manager 3.8.1
Aladdin Systems StuffIt Deluxe 3.0.6
AppleScript (basic functions)

Apple Macintosh PC Exchange 2.0
Apple QuickTime 2.0
CE Software QuickKeys 3.0
Clarisc FileMaker Pro 2.1v3
Clarisc MacWrite Pro 3.0
Data Description DataDesk 3.0
Deneba Canvas 3.0

Disinfectant 3.6 (shareware)
Fractal Design Painter 2.0
Insignia Solutions SoftWindows 1.0, 2.0 ^B
Macromedia FreeHand 5.0
Microsoft Excel 5.0
Microsoft FoxPro 2.6
Microsoft Word 6.0.1

Microsoft Works 3.0 ^A
Novell WordPerfect 3.1
QuarkXPress 3.2.1 ^C
SCSI Probe 3.8 (shareware)
Specular International Infini-D 2.6
Symantec Norton Utilities 2.0 ^D
Wolfram Research Mathematica 2.2.2

^A Calendar function crashes, probably due to unimplemented time services in Quix software. ^B Beta version 2.0 experiences screen redraw problems, possibly due to unimplemented time services in Quix software. ^C Froze once, but problem could not be reproduced. ^D Norton SpeedDisk and Disk Doctor.

Features yet to be implemented

- ADB input
- AppleTalk and serial peripheral support
- Floppy drive
- Network services
- PCI
- Sound
- Timing services
- Video adapters

Known bugs

- Timing services: Errors in date and time stamps, screen redraws, or anything else that accesses the clock; will be corrected when timing services are implemented.
- Moving the mouse on a restart (while screen is black) causes a freeze or crash.
- Key-code assignments not all properly mapped.

BEHIND OUR TESTS

Macworld Lab conducted hundreds of common operations with 28 software applications running on prototype Quix Mac OS software and prototype PReP-based computers from FirePower Systems and Motorola. We found no significant problems, except hardware incompatibilities derived from

OS functions that Quix had not yet implemented in the prerelease software tested. Quix expects no technical difficulties in solving those problems.

—**Macworld Lab testing supervised by Mark Hurlow, Danny Lee, and Tim Warner**

world Lab testing validates this observation for all applications tested (including many of the most popular programs on the Mac), none of which show evidence of hardware dependencies.

No Different than Today's Clones Plus, clone makers like Power Computing and Radius, who may use non-

Apple ASICs in their systems, are similarly susceptible to incompatibilities with such sloppily-coded applications. "Any software coded to the metal [ASICs] won't run on CHRP either," Miranker points out. "The real issue is that unless you build a literal clone [a copy of the current Mac hard-

ware design, like those from Radius and Power Computing, using Apple-designed chips], the applications have to operate largely or exclusively on system services, or they won't run. It's only incidentally a Quix issue."

And, of course, compatibility is never absolute, even in Apple products. The story

"System 7.5.2 Fixes," elsewhere in this issue's News section, details some 17 bugs, incompatibilities, and other anomalies within or caused by the latest release of Apple's system software. It's more of a business and marketing question—is 99 percent or 98 percent compatibility sufficient?

Which Clone Strategy?

If Apple, Quix, and IBM can successfully move through a technical review, the future of the Quix product will rest on whether Apple sees it as a good business opportunity. And that seems to be the key issue at Apple—how best to open the Mac market to cloning and OS licenses. Apple refuses to share its business assessment of Quix, but the risks and opportunities seem apparent.

What Apple Risks Apple harbors several legitimate fears, noted in Gable's letter to Grawehr. The most significant of these may be that a port to PReP could delay or distract attention from the transition to CHRP, in part because the team moving the Mac OS to CHRP is the most qualified group to work with Quix on the port to PReP. Apple is sufficiently concerned about the need to move to CHRP quickly that it now plans to move System 7.5 as well as Copland to CHRP. (Initially Apple had planned to move only Copland to CHRP.) Apple's Gable says that both systems are on similar schedules, and may be shipping in CHRP boxes by the end of 1996, though Copland development is widely assumed to be behind schedule. The decision to port System 7.5 should improve Apple's chances of meeting its prediction that CHRP-based Macs will be available by the end of 1996. Analyst Hartsook believes that Apple may actually release System 7.5 on CHRP as early as mid-1996.

Outside Apple, however, none of those interviewed for this story express concern that the Quix project would obviate or significantly delay a move to CHRP. (Grawehr says that he would need relatively little support from Apple; but to embrace the Quix project, Apple might insist on full-scale involvement of its engineering team.)

Apple may also fear cannibalization of its market share

from PReP machines, though it would face the same competitive challenges when CHRP computers become available. If Apple is serious about building a Mac-clone market that can grow the Mac OS portion of the PC market, it must face the prospect of seeing some of its own market share eroded by the clone makers, at least temporarily.

Perhaps a bigger concern than cannibalization is loss of control over the Mac hardware platform. PReP is IBM's current hardware standard. Apple refused to sign on to PReP, and instead talked IBM into modifying PReP into CHRP and giving Apple part ownership of the joint platform.

What Apple Could Gain Still, a successful port to PReP offers three appealing advantages for Apple.

- **Bigger Mac market.** Most important, several key vendors, led by IBM, could jump into the Mac-clone market. In addition to IBM and FirePower, current PReP developers include Motorola, Toshiba, Canon, and a large and powerful consortium of Taiwanese computer makers. In short order, such vendors could offer a key advantage: the ability to run more than one OS on a single, relatively inexpensive machine. The PReP machines would offer Windows NT in addition to the Mac OS (and when it ships, OS/2 Warp). IBM and others have long coveted this flexibility to make PowerPC-based systems a bigger force in the business market. It's also a major reason for building the CHRP design.

- **More varied Mac market.** Along these lines, a PReP-based Mac clone could provide a bridge to CHRP-based Macs by allowing Mac OS licensees to do something they can only dream of now—differentiate their products from Apple's on a hardware level, rather than merely on the basis of pricing and feature mix. PReP could support a genuine Mac-compat-

ible market—machines functionally equivalent to Apple's but with a wide range of hardware options—as distinguished from today's clone market, which offers only modest adaptations of Apple's machines. This would allow Apple to concentrate on being a technology leader and competing where it can win, while creating broader opportunities for clone makers to go after markets where Apple has historically been weak, thereby growing the overall Mac OS market share.

"The way that Apple certifies [licensees]," says Rick Schrameck, executive vice president of Radius, "you can be nothing but a clone. You can only build what Apple builds, period." The only options are building systems cheaper or marketing them where Apple has failed, he adds.

Apple has not devoted the resources that would be needed to support licensees' efforts to differentiate their products from Apple's designs (see "Is Apple Serious about Clones?" *Macworld*, August 1995). The Apple source indicated that PReP-based Mac compatibles might be easier for Apple to support than the current Mac clones, although not as easy as CHRP-based machines.

"We believe that differentiation is truly the only way to spread the Mac OS," says Schrameck. "It's the compatibles versus the clones. A compatible strategy leads to market expansion, and a clone strategy leads to market-share infighting." The Mac OS will never proliferate on price competition alone, he concludes.

- **New weapon in the OS wars.** To analyst Hartsook, the biggest advantage of Quix for Apple lies in its timing—at the onset of a critical period of

competition for the Mac OS against Windows 95 and Windows NT. "The total market for [PReP machines running the Mac OS] would be small, [but] if Apple can use this [Quix] engineering team to get System 7.5 running on PReP and CHRP earlier than they would have otherwise, then they should do it—unless they feel their own efforts are so close that it could just compli-



Believe it: Mac OS on an IBM.

cate things," Hartsook says. "The advantage here is an acceleration of Apple's own effort. I don't see [the Quix effort] showing up as a separate branded product." Instead, customers would just see new companies selling Mac-compatible systems running Apple's System 7.5.

Hartsook says the Quix project could prove to be significant in the battle against Windows 95 and especially Windows NT—which Hartsook calls "the real threat"—in large businesses. Microsoft has yet to execute plans to endow NT with a Windows 95-like interface, access to Microsoft Network, or the ability to run Windows 3.1 or Windows 95 applications. Today, "Apple can say they have 1000 native apps for the Mac, and Windows NT only has Microsoft Office"—but not for long, he adds, so Apple must move quickly.

continues

IBM Holds Off on Mac OS

FUTURE SYSTEMS WILL OFFER MAC OS AS OPTION

IBM has no plans to license Apple Computer's current Macintosh hardware design and operating system, according to an IBM executive. While standing by its commitment to offer a future version of the Mac OS, code-named Copland, that will run on its PowerPC-based computers using the Common Hardware Reference Platform (CHRP) being developed with Apple, IBM officials say that the company will not license the current System 7.5 OS on today's Mac hardware.

The marketing and sales-channel efforts would be too great to justify building an IBM-labeled Mac clone before the

release of CHRP and Copland, which are both due in late 1996 or early 1997, says Gary Griffiths, director of business development for IBM's Power Personal Systems division.

"This year, no, IBM is not building a Mac clone," confirms a spokesperson with the IBM division, which has responsibility for developing IBM's PowerPC-based PCs and workstations. "The focus of our concentration right now is on the common hardware platform that will also run the Mac OS." Apple declined to comment on the IBM statement.

IBM maintains that—contrary to recent press reports in



MacWeek, the *New York Times*, and other publications—its licensing strategy has not changed since the company first announced the CHRP development effort with Apple in November 1994. IBM's original and current mission remains offering the Mac OS as an option, rather than becoming a Mac-clone maker. IBM's focus for its CHRP systems will be OS/2, with the Mac OS, AIX (a

Unix variant), and Windows NT as options. (OS/2 for PowerPC is expected to ship this fall, after several delays; AIX has been shipping for PowerPC for more than a year; and Windows NT for PowerPC shipped in late June.)

At the launch of IBM's PowerPC-based computers at the PC Expo show in mid-June, the company said that it was negotiating with Apple to license the Mac OS. "We're willing to do it," said Rick Thoman, group executive of the Power Personal Systems division. "We're talking with Apple about how to go to market." These comments were misinterpreted to mean that IBM would license today's Mac hardware architecture and OS, IBM officials say.—CHARLES PILLER WITH CARA A. CUNNINGHAM

Appeal for PReP Makers

Companies other than Apple have two incentives for using the Quix port of the Mac OS to PReP. One is higher sales of PReP systems, and the other is a better transition to CHRP.

Possibly High Sales

How fast could a Mac-on-PReP market emerge? IBM's Griffiths would not estimate IBM's sales for Mac-on-PReP computers, but he views the opportunity as promising for IBM's corporate, small-office, and consumer sales alike.

"The market would develop overnight," FirePower's Miranker predicts. In the first year after the products become available, he estimates, combined sales from all vendors could reach more than a half million, several times the expected sales of today's Mac clone makers.

"I would be more than happy to go into the marketplace with a product about which I can say, 'OK, we've tested it with the following 200 applications,'" says Miranker, whose company sells complete

PReP systems to other companies that relabel the machines for resale. "We would guarantee that within 90 days we would make other apps work as well."

Hartsook sees PReP-on-Mac sales as much smaller, perhaps in the range of 50,000 units in 1996, but views the port to PReP as a short-term, yet potentially critical, bridge to CHRP for large businesses. "[The Quix project] would allow companies to start evaluating a non-Apple platform for the Mac OS. I don't believe there would be a big deployment of PReP machines, because [large businesses] know CHRP is coming," he says.

Aid to CHRP Transition

"But much more important, it [would] mean faster adoption of Mac clones, because companies that are not interested in an Apple Mac—but might be interested in an industry-standard platform with the Mac OS—would have six to nine additional months for their evaluation," Hartsook says. This could dramatically speed up the adoption curve for

CHRP-based Macs, he adds.

"I view this as something that Apple should be pushing us to do, without fear of its jeopardizing CHRP. I'd characterize it as a CHRP bridge, and by no means a CHRP replacement," says Griffiths. "Even if the Quix project doesn't succeed, it would teach us a lot about what we need to do with CHRP."

The Apple source, though extremely skeptical of the Quix product, acknowledges that PReP-based Macs could help the CHRP transition. If everything worked out as planned, the source said, "it would set things up nicely for the CHRP environment."

"Something like the Quix project will not only give people like us a quick entry into the Mac market with strategically different boxes," says Miranker, "it's also an insurance policy for CHRP in the event that there are any problems or incompatibilities in the early stages."

Poison the Ants

Apple's concerns about Quix are far from trivial, but at this

juncture can Apple afford, once again, to act conservatively? Do the risks of the Quix project—cannibalization of Apple's market, some licensee-support burdens, possibly some loss of control over its hardware platform, and the prospect of distracting key engineers at a crucial moment—warrant a decision to pass up a potentially strategic opportunity to increase the Macintosh OS market share?

"The Quix effort may pose problems to work through," says Miranker. "The question is, if you're trying to get rid of ants, do you poison the ants or do you burn down your house? I would poison the ants. Let's not lose sight of who the real competition is. The real competition is Intel, not the other PowerPC developers." **m**

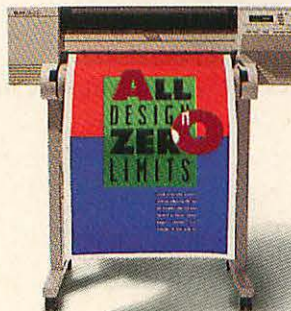
Senior editor CHARLES PILLER covers Macintosh OS licensing and the clone industry. Additional reporting by senior editor HOWARD BALDWIN.

Quix can be contacted via the World Wide Web at <http://www.quix.ch>.

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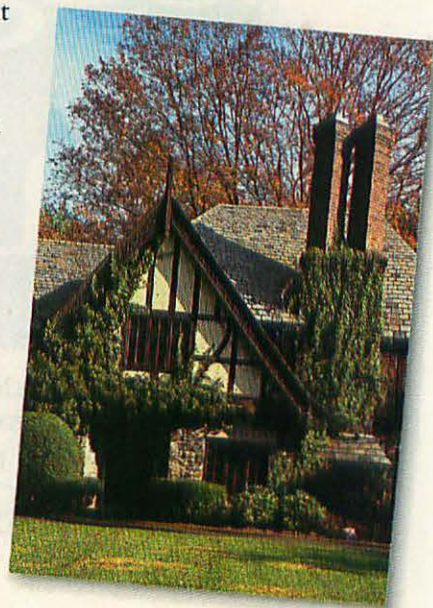


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Power Mac News

Optimizing for the 604

A LITTLE EXTRA
WORK RESULTS IN
A HANDSOME SPEEDUP

Is a PowerPC 604-based Power Mac going to be twice as fast as a 601-based Power Mac at the same clock speed? That depends on the software, according to compiler writers, application developers, and CPU designers at Motorola, which codeveloped the 604 with IBM and Apple. If the software's code is optimized for the 604, you can expect better performance than on a 601 even at the same megahertz rating. Thus, you should get faster calculations on a 100MHz 604-based system like the new Power Mac 8500/100 than you would on the discontinued 100MHz 601-based Power Mac 8100/100.

There are two issues related to 604 optimization that call for some code rework: data alignment and instruction scheduling.

Originally, some developers, for example, simply recompiled their existing 680X0 applications with a PowerPC compiler to get a native PowerPC product to market quickly. This meant that the program code typically contained many data structures that weren't optimized for PowerPC CPUs, which prefer to see all data in 4-byte chunks. (A 680X0 CPU, on the other hand, prefers data in 2-byte chunks.) On a 601, performance suffers for such programs with misaligned data, and the 604 is

even less forgiving of "wrong-size" data.

To optimize performance for a 604, app developers must purge code thoroughly of leftover 680X0-style data structures.

The second issue concerns parallelism. The 601 can issue two instructions per clock cycle—one to an integer-execution unit and one to a floating-point unit. The 604 can issue five independent instructions per cycle: two simple integer, one special integer for multiply/divide operations, one load/store, and one floating-point. The catch, of course, is that the code actually has to tell the 604 to do this. While the 604 has a built-in method for looking ahead in the instruction stream to find independent code branches to execute (so it can have as many as five operations running simultaneously), the right decisions in the application design and in compiler strategy help the look-ahead process greatly.

Apple, having staked its future on the PowerPC chip series, held a special compiler designers' conference in April to make sure that application developers would have the tools to make 604-optimized programs show big speed improvements over their 601 versions. John McEnerney of the compiler company Metrowerks reports that its CodeWarrior 7 compiler, for example, will have an option to optimize for 604.

Apple itself is 604-optimizing low-level code, such as QuickDraw, to improve system-dependent performance. Tim Olson, an Apple engi-



neer who is on assignment at Motorola's chip-design facility in Austin, Texas, predicts that as developers and compiler vendors become more familiar with the tricks of instruction-scheduling parallelism, and learn how to cooperate better with the 604's internal scheduler, users will see application performance on 604-based Power Macs improve steadily.

On balance, developers are enthusiastic about their beta versions of programs running on the 604-based Power Mac 9500 and 8500 systems. Adobe Systems reports that Photoshop 3.04 runs at the expected theoretical speed improvement (about 90 percent), developers at Strata claim that a minimal recoding of Studio Pro 1.75 for the 604 has doubled its speed, and engineers at Cambridge Scientific Computing say that the performance of a 604 version of their ChemOffice Chem 3D 3.1.2 molecular-modeling software is impressive compared with its performance on scientific workstations. All developers contacted told *Macworld* that by the time 604-based systems are shipping in quantity, the current versions of their applications will be 604-opti-

mized. Make sure you look for upgrades for your power-hungry software.

Of course, there's a catch: software optimized for the 604 is not actually optimal for the 601. Programs that are rewritten for the 604 could be as much as 20 percent slower on a 601 compared with the pre-604 versions; most programs, however, won't show that much slowdown, because developers claim they will compile separate installations for 601 and 604 Macs, at least for the next year or so.

—CHARLES SEITER

Power Watch

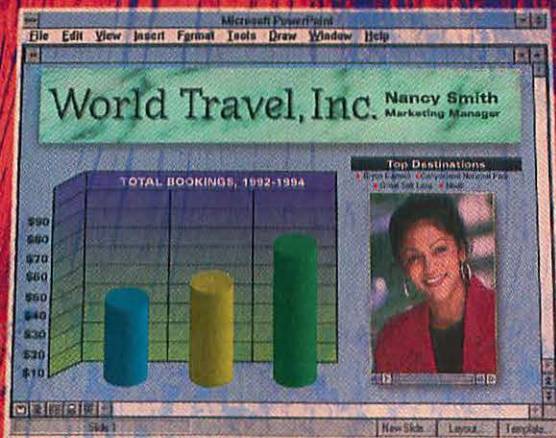
THE LATEST ON PRODUCTS
FOR THE POWER MAC

For those who want to practice no-hands computing, IBVA Technologies (212/754-4282) has released its mind-oriented development system and electroencephalograph for the Power Mac. The Interactive Brainwave Visual Analyzer (\$1295 to \$2295 depending on configuration) uses brain waves to control software and peripherals.

- Olduvai's Read-It OCR goes native with version 5.5. It lists for \$395, but through October 31 it costs \$199 direct from Olduvai (305/670-1112). Upgrades from 3.0, 4.0, or other OCR packages cost \$59.

- XLR-8 (817/772-0286) is shipping a clock-crystal accelerator for the Power Mac 9500. The Warp Factor 150MHz CPU booster costs \$249, claims speed boosts of up to 25 percent, and comes with a lifetime warranty.

—SUZANNE COURTEAU



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Macworld Online

by Macworld Online Staff

Grazing the World Wide Web is no longer a pastime reserved for the techno-elite. With Internet providers beating paths to nearly every door in America, and the major commercial online services boasting Web-browsing capabilities, anyone with a modicum of spare cash and time can enter the Web wilds as a cybertourist (for help from the experienced guides at *Macworld*, check out "Make the Right Connection" and "Pick the Best Browser," in this issue). But what about those adventurers who would like to pitch camp, even a small one, amidst the digital jungle?

Building Your Web Page

Launching a home page needn't be daunting. If you simply want to post a Web page or three, many Internet providers allow subscribers to become Web publishers at little or no cost beyond the monthly Internet-access fee. For instance, the San Francisco Bay Area-based WELL (415/332-4335; <http://www.well.com>) invites subscribers to post personal Web pages on the service's server, charging \$5 a month beyond the monthly \$15 access fee (includes 5 free hours of online access) for home-page files up to 2MB in size. On the East Coast, Calyx Internet Access (212/475-5051; <http://www.calyx.net>) allows SLIP and PPP subscribers to post Web pages as part of the service's \$25 monthly fee (includes the first 20 hours).

To consult a Web-based listing of providers in your area, see http://www.yahoo.com/Business/Corporations/Internet_Access_Providers/. By

the time you read this, most of the commercial online services should be allowing subscribers to post their own home pages.

Deciding how to construct your page is the next hurdle. Whether contemplating a charming vanity site, replete with candid photos and diary entries, or designing a commercial venture that promotes a service you believe will be of interest to fellow Websters, you must submit to the constraints of HTML (HyperText Markup Language), the page-layout language of the Web.

Working in any text editor, you embed HTML codes to give your text the proper appearance. For instance, if you want to display a word in

boldface type, you must type the codes `` and `` before and after the word, respectively. Because the HTML syntax is fairly limited, it isn't that difficult to learn. In addition, there are free and shareware applications such as HTML Editor, AutoWeb, and Arachnid that help to automate the process. And you can always peek at how other authors constructed their pages by viewing source code from within your browser while online.

Once you've built your page, you can send it off to your service provider and wait for the kudos to roll in. But don't rest on your laurels. The Web is a dynamic medium, and change is more than the rule, it is the unrelenting

taskmaster. If you are to attract a faithful audience that returns regularly to your site, remember the real estate agent's Web advice: update, update, update.

Web Design Tips

The most important fact to remember when constructing a Web page is that each viewer will almost certainly see a somewhat different page. Not only do the various browsers display HTML tags differently, but users are free to define their own fonts and sizes for body type and headlines. Users can also decide how wide to set the page. Don't count on set word wraps.

As inviting as multiple graphics may look in the mock-up on your desktop, don't forget that each one takes precious time to download. To mitigate this, offer viewers a thumbnail of the image, which grows to fill the screen if the viewer clicks on it. Limiting the color palette for the image is another trick that elicits dramatic file-size reductions.

Web patrons are a notoriously fickle lot, bouncing from one site to another on a whim. One way to win longer-term affections is to ensure that your visitors never feel lost. Provide coherent links between pages and never underestimate the value of a well-designed navigation bar. **m**

LIVE-EVENTS CALENDAR

Plug into Macworld Live for our weekly real-time events that feature some of the brightest stars in the Macintosh universe. In addition to our troubleshooting clinics, we bring editors and writers, artists and visionaries directly to your desktop. It's a great place to spend an hour learning about your Mac. AOL events are on Thursdays, and eWorld events are on Wednesdays. All events are 6 p.m. Pacific time.

Ask Cary Lu September 6, eWorld

Cary Lu is *Macworld's* digital nomad, reporting on mobile- and remote-computing issues in his *PowerBook Notes* column. Once a month, Cary checks in to answer your questions on these topics and more.

The Art of Macworld September 7, AOL

Associate art director Kent Tayenaka demystifies the process and philosophy behind *Macworld's* award-winning illustrations and designs. Come for a peek behind the scenes at the *Macworld* art department.

The Musical Macintosh September 14, AOL

Well-known for its ability to imple-

ment technology like MIDI and QuickTime, the Macintosh is often the musician's tool of choice for bridging the gap between music and machines. Dominic Milano, editorial director of *Interactivity* magazine and one of *Keyboard* magazine's founding editors, talks about the Mac's musical proclivity.

Costa's Clinic September 20, eWorld September 21, AOL

Are you a new Macintosh owner or a power user in training? Join *Macworld Online's* technology guru Steve Costa for these monthly virtual Mac clinics. Steve will help you tune up your computer, outfit it with great shareware, and give you the scoop on all things Macintosh. Come armed with questions and comments.

Jim Heid Q&A September 28, AOL

Contributing editor Jim Heid's *Complete Mac Handbook* is a fantastic compendium of Macintosh lore that no Mac owner should be without. At this monthly event, Jim will be ready to answer just about any Mac question you can throw at him.

REACHING MACWORLD ONLINE

America Online and eWorld
Keyword is Macworld
World Wide Web
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<http://www.macworld.com>

Are you backing up or going nowhere?

You have good intentions. You drag your important files to a disk or server. But just imagine you need to restore everything right now. Ouch! Reassembling your hard disk would be like trying to put together the VCR your five-year old took apart.



To save time and space, we back up only what's new and different.

1. Dragging makes backing up a real pain. There's just too much to remember. Which files did you change? What's new? When did you back up last?



Ever try to restore an important file that's been dragged to a mountain of floppies? Good luck.

Retrospect® is the better way. It always knows when to back up and what's changed. And it's fast, automated, and painless. You can find a file in seconds. Or restore an entire hard disk in minutes – same as it ever was.



2. Backing up the right way is actually faster and easier. Retrospect gives you complete backup that saves time and backup media. Not to mention frustration.

3. It's not a matter of if disaster strikes. It's when. It'll happen to half of you this year. Fires, five-year olds, disk failures, a slip of a finger. Retrospect is simply your best insurance policy. Don't wait until it's after the fact to discover that the other guys' recovery tools won't bring back what's gone.



4. Retrospect teams up with tape or cartridges. It's no wonder Retrospect's bundled with just about every Macintosh tape drive sold. It's no slouch with SyQuest, MO, or Zip drives either – put them together with Retrospect and you've got a powerful backup machine.

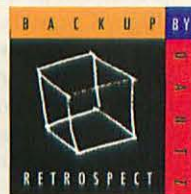
Nothing's as faithful as Retrospect. We even back up your preferences. So if disaster strikes you won't roll over and play dead.



NEW RETROSPECT 3.0
CALL TODAY FOR AN UPGRADE

5. All backup software's not the same. Retrospect's the most trusted and recommended backup software in the business. It has the awards. The reviews. The customers. Plus key features those other programs don't have – compression, encryption, comprehensive scheduling, and support for practically every SCSI drive in the universe.

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Get Retrospect free with the best backup drives. Look for this mark of quality.



dantz To go forward, you must backup.

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New Products

THE LATEST MACINTOSH RELEASES

by Jim Feeley
and Joanna Pearlstein

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. UNLESS OTHERWISE STATED, ALL PRICES ARE SUGGESTED RETAIL AND THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A **•** SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY MACWORLD. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

2.5 Data Storage Kit

So you've upgraded the storage in your PowerBook—now what do you do with the old hard drive? This external hard drive case holds your old internal 2.5-inch drive, letting you create a portable storage system. The case has a SCSI switch and a DB 25 pass-through SCSI connector. The kit includes an HDI-30-pin-to-25-pin SCSI adapter, an ADB power connector, an AC power supply, and a soft carrying case. \$99.95. International Datawares, 408/262-6660, 800/222-6032.



2.5 Data Storage Kit

AlphaScan 17mx

The 17mx monitor's flat-square Hitachi CRT delivers a 16-inch-diagonal viewing area. This general-use business monitor offers digital controls, Energy Star and MPRII compliance, a 0.28mm dot pitch, and a maximum Macintosh resolution of 1152 by 882 pixels at 75Hz. \$699. Sampo Technology, 404/449-6220; fax 404/447-1109.

CD Tower

Procom's CD-ROM towers provide simultaneous network access to multiple CD-ROMs. In addition to the previously supported 2X and 4X drives, the towers are now available with 6X CD-ROM drives that support a transfer rate of 900 Kbps. Support for SCSI LUN (Logical Unit Number) permits the towers' 7 CD-ROM drives to share a single SCSI ID. Towers and rack-mount systems are available for 7, 14, and 21 drives. 7-bay 6X CD Tower \$7015. Procom, 714/852-1000, 800/800-8600; fax 714/261-7380.

Diamond Scan 17HX

This 17-inch flat-square monitor is designed to meet the needs of desktop publishers and cost-conscious CAD users. The Invar shadow-mask monitor has a 15.7-inch-diagonal viewing area, a 0.26mm dot pitch, and a maximum Macintosh resolution of 1280 by 1024 pixels at 80Hz. The 17HX meets Energy Star, MPRII, and Nutek standards. \$879. Mitsubishi Electronics America, 714/220-2500, 800/843-2515; fax 714/229-3854.



ImagerPlus 18xf

ImagerPlus 12xf and ImagerPlus 18xf

NewGen's two new ledger-size monochrome printers are designed to produce final proofs and camera-ready art. The first laser printer to use the new TEC A-659 engine, the ImagerPlus 18xf provides output of up to 1800-by-900-dpi resolution with 200 gray levels. The ImagerPlus 12xf uses the TEC A-655 engine, which provides up to 1200-by-1200-dpi output. The 18xf comes with 48MB of RAM and built-in Ethernet. The 12xf includes 40MB of RAM, with Ethernet available as a \$399 option. Both printers support paper up to 11.9 by 19.5 inches, include SCSI ports, and come with 60 built-in PostScript fonts. 12xf \$6195; 18xf \$7995. NewGen Systems, 714/641-8600; fax 714/641-2800.

Presenter 580/5200

This video adapter enables Apple's all-in-one education-market computers, the Power Mac 5200/75 and LC 580, to drive external monitors, LCD panels, and other presentation devices. The adapter installs in ten minutes and doesn't require drilling or soldering. Maximum resolution on the 5200/75 is 832 by 624 pixels at 75Hz. On the LC 580, the adapter supports 640 by 480 pixels and 800 by 600 pixels at 72Hz. The company also makes adapters for earlier all-in-one Macintoshes. \$79. PowerR, 206/547-8000, 800/729-6970; fax 206/285-0260.

SCSI Isolating Regenerator

If you need to run SCSI cables beyond SCSI's 18-foot length limit (25-foot for differential SCSI), installing a Regenerator box lets you double the limit. A Regenerator also isolates your SCSI chain, allowing you to remove or replace SCSI devices without shutting down your system or affecting other peripherals on the bus. Available in several models including narrow, Fast, Wide, and differential SCSI, with prices from \$150 to \$695. Paralun, 619/560-7266; fax 619/560-8929.

Smart Label Printer EZ30

Designed for one-at-a-time label printing, the SLP EZ30 sports an easier-to-use design, newer software, and a lower price than the SLP Plus it replaces. The printer is roughly the size and shape of a rotary card-file and prints a variety of labels, including those for envelopes, file folders, VHS tapes, disks, name badges, and bar codes. \$199. Seiko Instruments USA, 408/922-5840; fax 408/922-5800.

SoftBoard model 205

Geared toward small conference areas and individual workstations, this electronic whiteboard uses a laser-scanning technology to track dry-erase markers across the writing surface. The board



SoftBoard model 205

translates whatever you write or draw into digital data that a Macintosh or Windows computer can display, print, save, or (with optional software) transmit to remote computers. The board is 39 inches high and 40½ inches wide, with a writing area of 25½ by 34 inches. SoftBoard can be mounted on walls, hung in cubicles, or placed on tabletops. \$2795. Microfield Graphics, 503/626-9393; fax 503/641-9333.



SpectraStar Model 240

SpectraStar Model 240 and Model 280

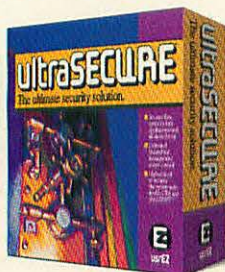
General Parametrics recently introduced two new color thermal printers. The budget-price Model 240 comes with 6MB of RAM (expandable to 24MB), 52 fonts, a 25MHz RISC processor, and expansion slots. An additional 4MB of RAM enables it to print at 600 by 300 dpi. The speedy Model 280 prints 600-by-300-dpi images with its included 10MB of RAM (expandable to 32MB), 33MHz RISC processor, and expansion slots. According to the company, a proprietary technology allows these printers to produce images equal in quality to those created with a 105-lpi lithography screen. Both printers use the same Sharp printer engine as comparable Tektronix printers, but the SpectraStars print over 50 percent faster on plain paper. 240, \$2995; 280, \$3995. Optional 120MB hard drive \$895; Ethernet interface \$795. General Parametrics, 501/524-3950, 800/223-0999; fax 510/524-9954.

Stampede Removable Storage

OK, we've all heard about the enormous storage needs of digital-video and prepress professionals. MountainGate thinks supporting 400GB of data on a single SCSI bus should satisfy just about everyone . . . for now. The company's Stampede removable hard drive systems are hot swappable, allowing users to switch drives without first shutting down the system. The Stampede uses dual-continues

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Circle 36 on reader service card

New Products

redundant power supplies and fans. A variety of docking stations and drive modules are available. Eight-bay rack-mount docking station \$1750. MountainGate, 702/851-9393, 800/556-0222; fax 702/851-5533.

SOFTWARE

Claris Emlayer

Do you wake from nightmares in a sweat, having dreamt of drowning in E-mail? Claris Emlayer aims to help you manage your E-mail. The product creates a single in-box that collects all your AOL, CompuServe, eWorld, RadioMail, and Internet mail. You can define mail actions to automatically forward, file, or reply to messages. The product includes an address book and supports common Net compression methods including BINHEX, uuencode, and MIME. \$89. Claris, 408/727-8227, 800/325-2747; claris.cr@applelink.apple.com.

Ergoware

You thought only humans nag? Wait till your computer starts bugging you to take regular breaks to prevent repetitive strain injuries (RSIs). Applied Software's Ergoware prompts users to take breaks and leads them through stretches designed to prevent carpal tunnel syndrome, tendinitis, and other RSIs. Ergoware also provides information about workstation ergonomics. \$69.95; site licenses available. Applied Software Unlimited, 408/364-0484; fax 408/364-0345; asuinc@aol.com.



Flickz

Flickz

This new plug-in for Adobe PageMaker 5.0 lets you place movie stills in your newsletter or other documents. Flickz converts QuickTime movies to clip-art images, which you can then place individually by frame or as a group. You can even create flip books by printing a group of placed frames. \$59. ShadeTree Marketing, 602/279-1874, 800/678-8848; fax 602/279-1874; 74640.3466@compuserve.com.

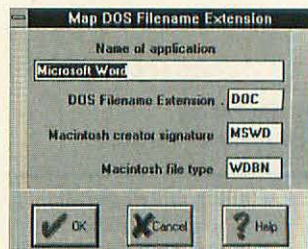
The Fondler

Think of it as a virus checker for your fonts. Rascal Software's The Fondler diagnoses font problems: it checks font integrity, identifies and corrects font-ID conflicts, flags missing screen or printer fonts, and checks for corrupt fonts. Plus, it can identify approximately 90 other problems. (Yes, Macworld wondered about the name too. Rascal Software assures us it's derived from the term *Fond*, for Font family Descriptors.) \$69.95 company's estimated price. Rascal Software, 805/255-6823; fax 805/255-9691; 71604.3123@compuserve.com.

GrabNet 1.0

Sure, the World Wide Web is a great place for collecting information, but

what do you do about that common side effect of Web cruising—a cluttered hard drive? ForeFront Group's GrabNet is a Web browser companion tool that enables you to store information gathered from the Web in custom folders on the desktop. It helps users snip pieces of information—such as text, images, and URLs (Uniform Resource Locators)—so that they're easier to reuse, navigate, and organize. \$19.95. ForeFront Group, 713/961-1101, 800/961-1101; fax 713/961-1149; <http://www.ffg.com>.



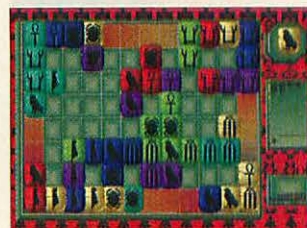
Here & Now

Here & Now

Nowadays Macintoshes come with PC Exchange, a control panel that lets you easily access DOS and Windows files. Here & Now returns the favor for DOS and Windows users, giving them access to your Mac files. The file-interchange utility lets Windows and DOS users read and write Macintosh files from a PC. If Mac files have predetermined "extensions" tacked on, Here & Now can automatically link them to the appropriate DOS or Windows file extensions. It can preserve 31-character Macintosh file names for reference, and it supports optical media and hard disks. \$89.95. Software Architects, 206/487-0122, 800/405-0002; fax 206/487-0467; softarch@applelink.apple.com.

Ishido

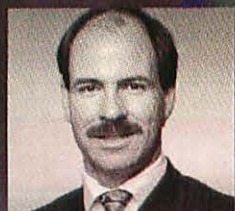
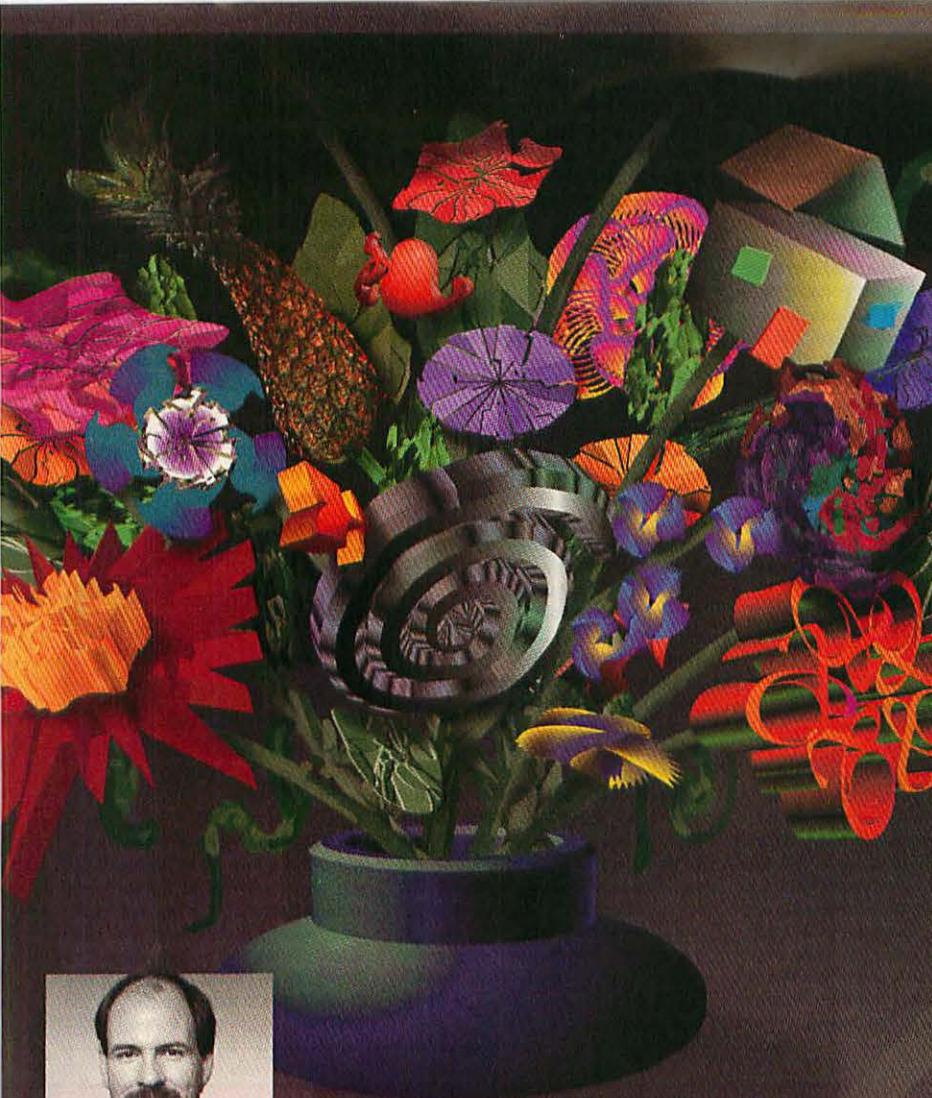
MacPlay's new solitaire tile game requires players to use strategy and concentration to match 72 tiles or stones on a 96-square board. The goal is to line up stones by color or symbol until the pouch of stones is empty. Tiles come in Asian, Maya, Native American, and Russian designs; a built-in paint program lets you customize the tiles. \$30 company's estimated price. MacPlay, 714/553-3530, 800/736-5738; fax 714/252-2820; <http://www.interplay.com>.



Ishido

NoteView

Call it Acrobat for music files. NoteView lets users view and play musical scores created with TAP (Temporal Acuity Products) Music Systems' notation software, Nightingale, via the Internet. Users can download, read, and play scores *continues*



"KPT Vector Effects is a must have for every Illustrator!"
Sean McKenna, Adobe Illustrator Product Line Manager

Adobe and Macromedia agree:

"Don't use our products without KPT Vector Effects!"

KPT Vector Effects[®] makes your day-to-day Adobe Illustrator 5.5 or Macromedia FreeHand 5.0 jobs quicker, easier and better looking!

Eye-catching effects such as distortion, warping and 3D extrusion—once too difficult or simply impossible—take only seconds, thanks to KPT Vector Effects' powerful plug-ins.



In fact, they're "the ultimate addition to FreeHand," says James Von Ehr, Macromedia Vice President and General Manager.

Besides what's shown above, you can apply bevel embossing, perspective distortion, color tweaking, shattering, neonizing and other cool effects to text or objects. You would have to buy multiple plug-in packages just to duplicate a fraction of what KPT Vector Effects does for you!

Best of all, KPT Vector Effects' easy-to-use interface and previews let you work intuitively in real time, without ever leaving your bread-and-butter drawing program.

Imagine how much more productive you'll be with KPT Vector Effects.

To find out more, call us today:

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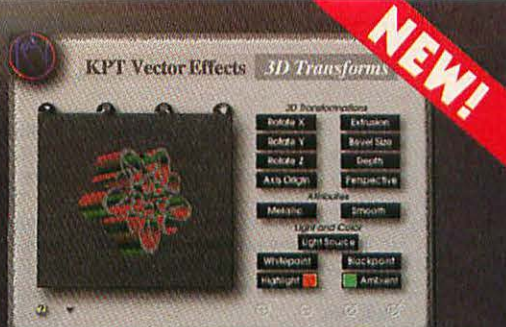


SOFTWARE

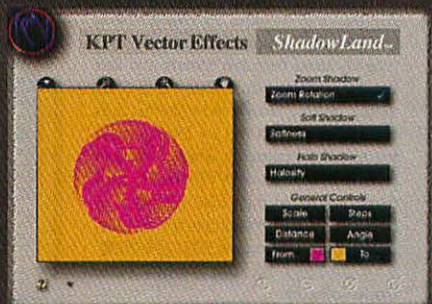
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even if they don't have Nightingale, allowing musicians to publish their work on the Internet and sample the work of others. Available free from online services and from the Internet at <http://www.jwpepper.com>. TAP Music Systems, 206/462-1007, 800/426-2673; fax 206/462-1057; tapmusic@aol.com.

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Like utilities but hate the hassle of configuring them? This prêt-à-porter utility package contains the three simplest components of Now Software's Now Utilities. Now Super Boomerang finds recently used files and folders and lists them in applications' Open and Save dialog boxes. Now FolderMenus adds hard drive navigation by letting users see a folder's contents when they drag an item onto it. Now WYSIWYG Menus displays fonts in their own typefaces in font menus. \$24.95 company's estimated price. Now Software, 503/274-2800, 800/722-5963; fax 503/274-0670; info@nowsoft.com.

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Impress your colleagues with apt quotations from obscure philosophers in your business reports. Leverage Technologies' Quotez lets you search its database of over 25,000 quotations by specifying author, topic, word, phrase, or combinations of those criteria. Retrieved quotes can be printed directly or exported to a word processor. \$44.95. Leverage Technologies, 216/838-1203; fax 216/838-1203; daveream@aol.com.

Ready, Set, Go GX 7.0

The latest version of this page-layout software adds support for QuickDraw GX. The Line Layout Manager gives users access to new GX typography features and to QuickDraw GX's enhanced printing interface, which includes page-by-page formatting and portable digital documents. RSG GX also supports drag and drop, curve drawing, and both spot and process colors. Manhattan Graphics ships the program with five bonus GX fonts from International Typeface. \$395. Manhattan Graphics, 914/725-2048, 800/572-6533; fax 914/725-2450; rsg@applelink.apple.com.



Ready, Set, Go GX 7.0

Schawk Roundup 2.0

This preflighting software aimed at the electronic prepress industry checks graphics files for composition and links. Designed to replace Quark's Collect for Output function, Schawk Roundup evaluates a file and generates a list of components so production specialists, service bureau technicians, and other users can determine whether any fonts or placed files are missing. The software works

with recent versions of Adobe Illustrator, Adobe Photoshop, Aldus FreeHand, Macromedia FreeHand, QuarkXPress, and PostScript files. \$99. Total Integration, 708/776-2377; fax 708/776-2378; 71214.20@compuserve.com.

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Dust off your quick-twitch reflexes: Ambrosia has another productivity killer. Swoop pits you, in your lone Starfighter, against relentless hordes of invading aliens. Fans of the arcade classic Galaga will recognize the action, right down to the squadron attacks and Challenge Waves. Ambrosia has also added some new twists, including power-ups that give you shields and extra firing capacity. Registration fee \$15. Ambrosia Software, 716/427-2577, 800/231-1816; fax 716/475-9289; ambrosiasw@aol.com.

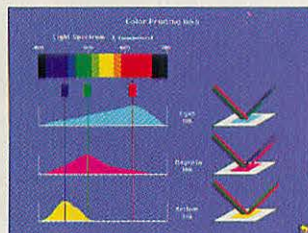
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TickerWatcher helps serious investors record, chart, and analyze live market data throughout the trading day. Depending on the configuration of the program in use, users can display stock quotes immediately, 15 minutes after posting, or at the end of the trading day. The product also includes features for portfolio management, charting, and technical analysis. An optional link for Microsoft Excel helps users calculate stock values. \$395 to \$695 depending on the frequency of data transmission. Linn Software, 404/929-8802, 800/546-6842; fax 404/929-8875; linnsoft@aol.com.

CD-ROMS

Applied Color Technology

Vision Publications' new CD-ROM aims to demystify electronic imaging and color printing. Applied Color Technology employs narration and animation to explain color theory, including color principles, the conventional color process, scanners, and color management. Information is technology-specific, not product-specific. On-screen tutor buttons provide access to five levels of information on each topic. \$99.50. Vision Publications, 610/255-0798; fax 215/255-5819; egsvp@aol.com.



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Your Uncle Bob will never live down that embarrassing moment at Thanksgiving if you've preserved it in Delrina's new multimedia family album. With Echo Lake, users record stories with text, video, photos, voice, and sound clips. Stories can be printed in a book format or saved as a stand-alone file you can continue.

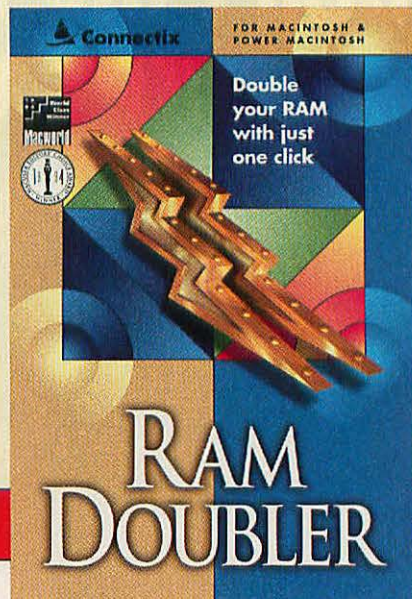
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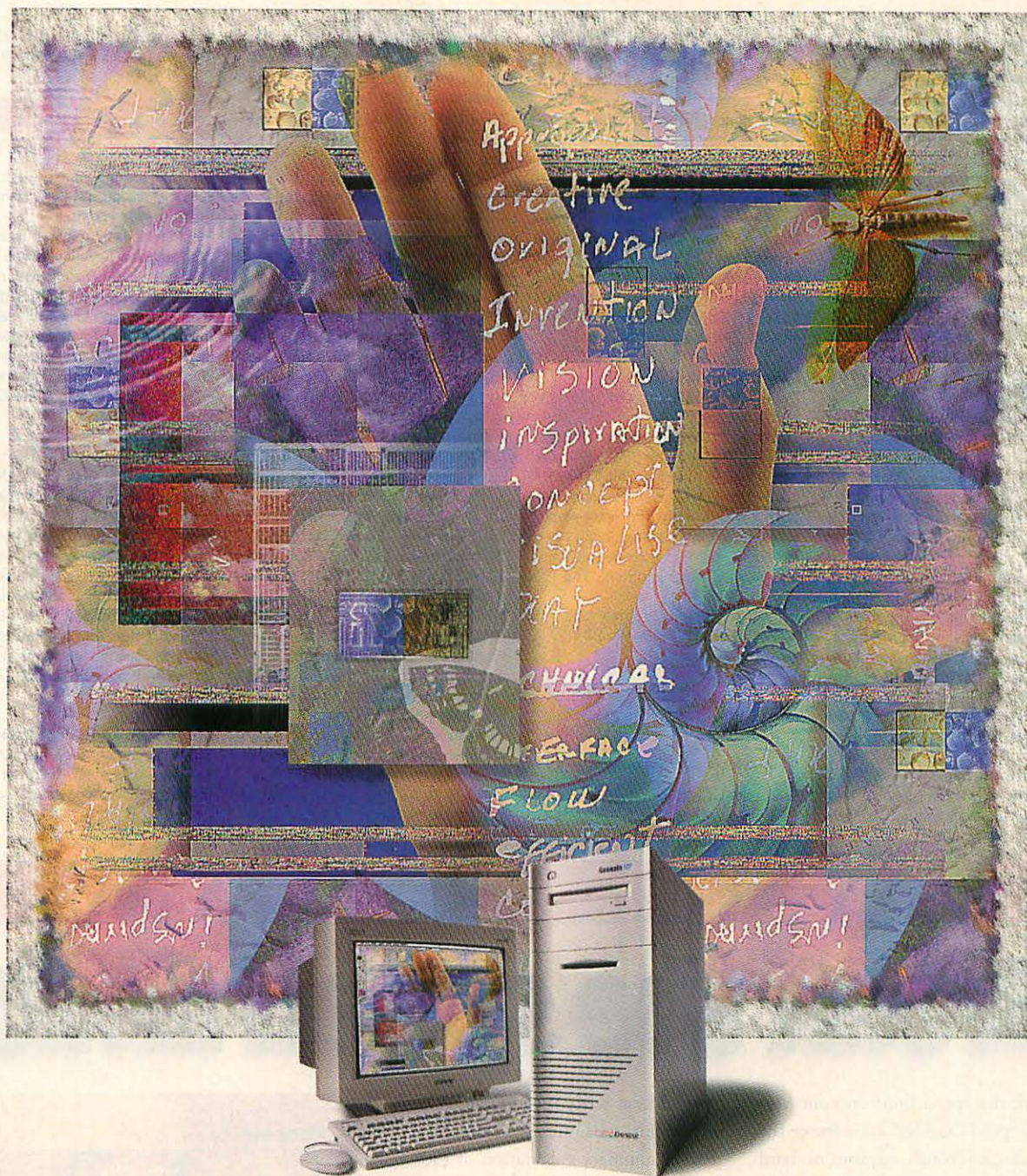
System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.



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Passage to Vietnam

From Alice to Ocean creator Rick Smolan's latest work is a journey to Viet-

nam. This CD-ROM provides a rare glimpse into a modern nation and its ancient culture. The disc includes photos taken by more than 70 photojournalists, plus an hour of full-motion video. It covers topics ranging from Vietnamese cultural heritage, to street life, to the legacy of Vietnam's wars with France and the United States. Users can participate in an interactive photo-editing session that shows how the photographs were selected. \$39.95 company's estimated price. Brøderbund Software (published by Against All Odds/Interval Research). 415/331-6300, 800/558-3388; fax 415/331-9400; aaopr@aol.com.

Phototone Alphabets

Cutting up newspapers to compose ransom notes and the like is tedious work. Letraset's Phototone Alphabets makes quick work of creating these and other distinctive documents. This CD-ROM contains images of letters photographed from a wide variety of objects—typewriter keys, stone carvings, neon signs, old books, movie marquees, price tags, and graffiti, among others. The CD



Phototone Alphabets

includes 550 letters scanned at both 75 dpi and 300 dpi. A thumbnail browser lets you search for letters that meet your specifications. \$199. Letraset USA, 201/845-6100, 800/343-8973; fax 800/656-6853.

The Way Things Work and My First Incredible, Amazing Dictionary

If you're running out of answers to those "but Mommy, why?" questions, these two CD-ROMs from DK Multimedia, a division of Dorling Kindersley, can help. They teach children how things work and what words mean. The Way Things Work uses illustrations, animations, and sounds to help users explore inventions and great discoveries. Biographies of scientists and inventors are included. Kids can hear words spoken and defined in My First Dictionary, which offers more than 1000 illustrations and includes 17,000 words. The Way Things Work \$79.95; My First Incredible, Amazing Dictionary \$39.95. DK Multimedia, 212/213-4800, 800/356-6575; fax 212/213-5240; dkmm@phantom.com.

Understanding Breast Cancer

Produced in cooperation with oncologists and reconstructive surgeons, Understanding Breast Cancer includes live video, animation, and narration to discuss causes, diagnosis, and prevention of breast cancer, in addition to its treatment via surgery, radiation, and drugs. The CD-ROM also contains contact information for cancer centers and sup-

port groups nationwide. \$69.95. ISM, 410/560-0973; fax 410/560-1306.

ACCESSORIES

Lumolabels

Do you ever find yourself with floppy disks that are stuck with so many labels that they barely fit into the drive? Erasable labels may be your solution. With Lumolabels, your writing is permanent unless you erase it with rubbing alcohol or a Staedtler Mars plastic eraser. Staedtler also makes Lumolabels for videocassettes and audiocassettes. A box of 18 Lumolabels, one fine-point black Lumocolor pen, and one Mars plastic eraser \$4.98. Staedtler, 818/882-6000; fax 818/882-3767.

Polka-disc

No, it isn't the new CD-ROM from Lawrence Welk. Polka-disc is another approach to solving the limited writing area of floppy disk labels. Polka-disc labels have a polka-dot pattern of adhesive that eases removal of disk labels. Rather than slap yet another label on your floppy, you peel the old label off and put a new one on. Packet of ten labels \$1 (quantity discounts available). Polka Dot Product, 612/824-1760; fax 612/824-1760.

Surge Safe and Surge Safe Pro

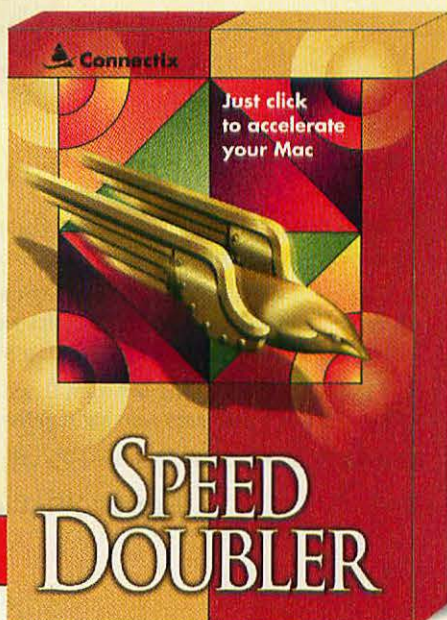
These six-outlet surge protectors are designed to protect electronic equipment from power-line disturbances such

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spreadsheet with Speed Doubler in 6 seconds, without it...13 seconds. Run a summary calculation of 1500 FileMaker Pro records in 90 seconds instead of 3 minutes. It's not magic. It's Connectix Speed Doubler. And if you own a Power Mac, you gotta have it. Get Speed Doubler today wherever fine computer products are sold. Your satisfaction is guaranteed.



Requirements: Macintosh equipped with a PowerPC, 68040, or 68030 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100

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your search, you can export one or one million of these names and addresses to your word processor or database for follow up. Looking for someone? Get the latest Select Phone and put 95 million listings at your fingertips.



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Surge Safe and Surge Safe Pro

as surges and spikes. Surge Safe has a 3-foot power cable; Surge Safe Pro adds EMI/RFI noise filtering, a power switch, and a 4-foot cable. Surge Safe \$12.95; Surge Safe Pro \$19.95. Newport, 619/677-5700, 800/639-7646; fax 619/558-1408.

Waterbed For Your Wrists

This gel-filled wrist rest conforms to the shape of your wrist and palms and, according to the company, lessens the physical stress associated with computing. The machine-washable fabric covers are available in many colors. Wavaco plans to release Waterbed For Your Notebook and Waterbed For Your Mouse soon. Wavaco, 813/723-2229; fax 813/722-5307.

BOOKS

Desktop Video Studio

Andrew Soderberg and Tom Hudson provide detailed yet digestible information

and tutorials on selecting, setting up, and using digital-video products for both Macintosh and Windows platforms. In addition to covering file formats and cross-platform and compression issues, the authors explain the different requirements and challenges of producing video for multimedia, tape, and broadcast. The included CD-ROM contains demo and locked versions of leading multimedia applications from Apple Computer, Macromedia, and Adobe Systems, in addition to clip media and interactive material derived from the book. 432 pages. \$40. Random House Electronic Publishing, 410/848-1900, ext. 3000, 800/793-2665; fax 410/386-7013.

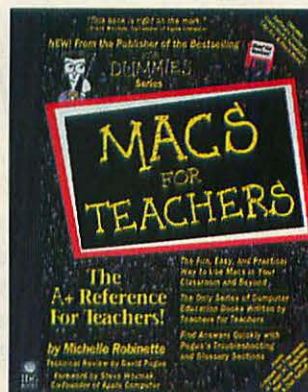
Everything You Need to Know (But Were Afraid to Ask Kids) About the Information Highway

"If you have a really tough problem with online connections, you may want to consult a fifth grader," advises Merle Marsh, author of this book designed to introduce parents to using telecommunications technology with their children. In nontechnical language, the book describes equipment and online services that will appeal to children. Funded by Apple Computer, the book includes activities organized by age group, information on child safety online, and an introduction to the Internet. 102 pages. \$5.95 (bulk discounts available). Computer Learning Foundation, 415/327-3347; fax 415/327-3349

Macs for Teachers

Michelle Robinette shows teachers how to harness the power of the Macintosh

for themselves and their students. Her goal is to help teachers use computers to make their lives easier. She provides hands-on information on software, CD-ROMs, and the Internet. She also covers larger issues such as running a



Macs for Teachers

school Mac lab on a limited budget and even suggests ways to build a successful program around a single Macintosh. The disk that is included with the book contains ClarisWorks templates, two fonts, and some clip art. 348 pages. \$19.95. IDG Books Worldwide, 415/655-3000, 800/762-2974; fax 415/655-3299.

Outrageous Macintosh Filters

David Busch teaches readers to understand and use myriad standard and third-party Photoshop-filter options. For

example, he teaches readers how to use Photoshop 3.0's Filter Factory and explains the difference between Blur and Gaussian Blur. Sample images show the effects of various common filters on images. A CD-ROM includes seamless textures, TIFF images, shareware, and demo versions of commercial filter programs. 400 pages. \$39.95. MIS:Press, 212/886-9200, 800/488-5233; fax 212/633-0748.

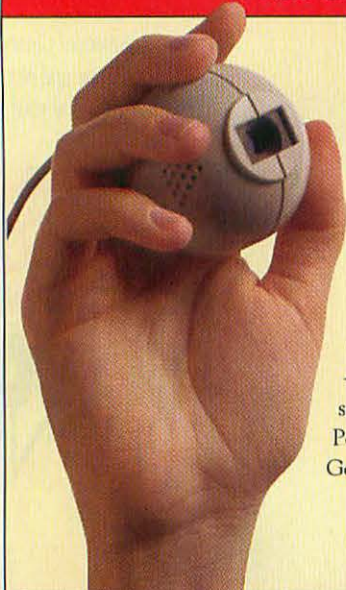
Photoshop Artistry: A Master Class for Photographers and Artists

This self-paced tutorial addresses the specific needs of photographers and artists. Authors Barry Haynes and Wendy Crumpler devised a series of 25 exercises that lead readers through a comprehensive course of artistic techniques to manipulate photographs. The book includes a CD-ROM that contains before-and-after images designed to assist readers with the lessons. 420 pages. \$44.99. Sybex, 510/523-8233, 800/227-2346; fax 510/523-2373. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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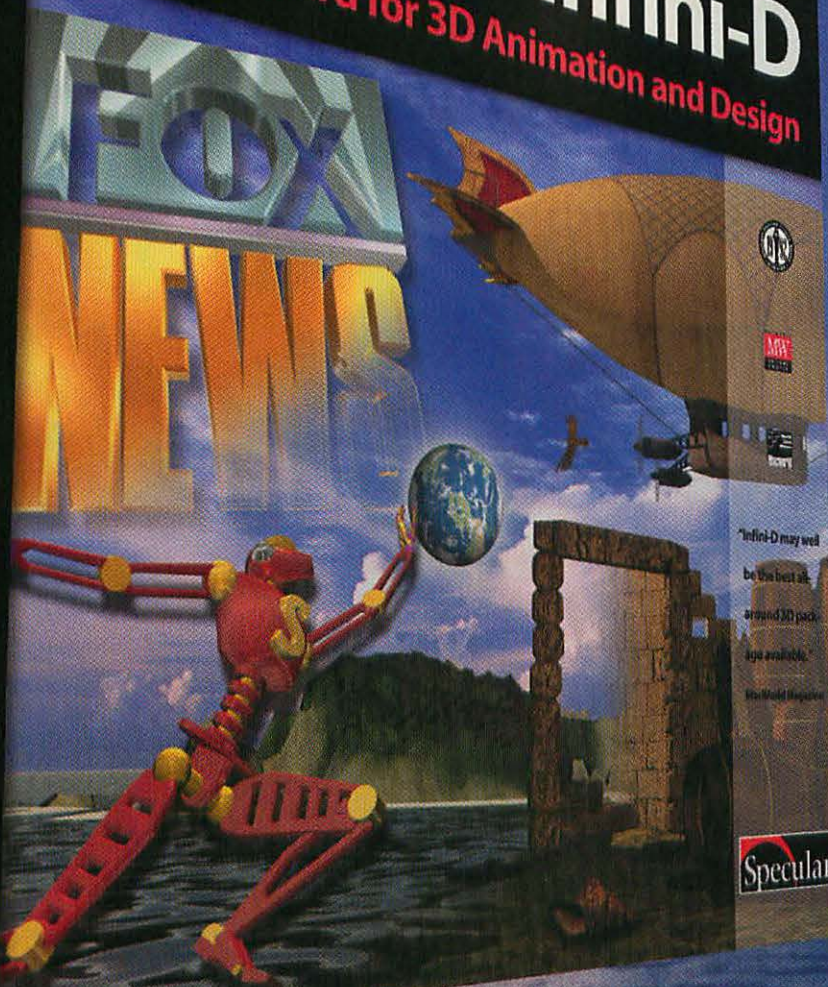
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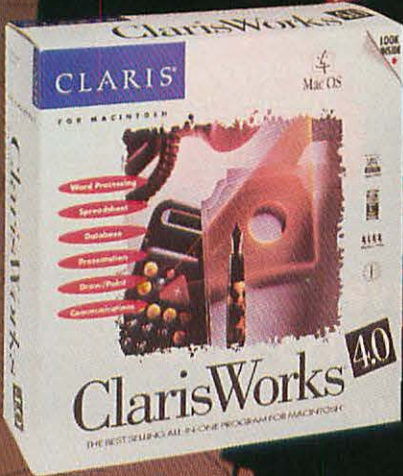
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MacUser, 1995

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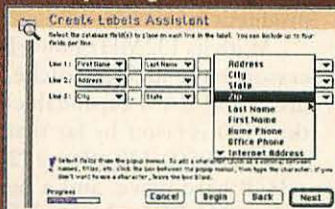
ers agree— quats out of Microsoft.

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Reviews

Power Macintosh 9500/132

System

PROS: Six PCI slots; fastest Mac yet; supports up to 768MB of RAM; improved SCSI Manager allows faster disk transfers; improved 680X0 emulator. **CONS:** No built-in video or video card; must remove cards, disconnect cables, and remove motherboard to install RAM. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$5799.



IF YOU NEED SPEED, EXPANSION, and a massive amount of memory, the new Power Macintosh 9500/132 is for you. With no built-in video, the limited availability of PCI cards, a street price near \$5000, and RAM slots that are difficult to reach without disassembling the computer, the 9500 is a poor choice for general use. However, Apple is aiming the 9500 directly at customers who are willing to pay top dollar for top productivity.

With its 132MHz PowerPC 604 processor, built-in 512K cache, 2GB hard drive, and RAM expandable to 768MB, the 9500 is faster by far than the 8100/110. The 9500/120 offers a 120MHz 604, a 1GB hard drive, and a bundled ATI Xclaim GA PCI video card, for \$800 less than the 132MHz 9500. Both systems include 16MB of RAM and a quad-speed CD-ROM player.

Tools for the Adventurous

The most significant new technology offered by the 9500 is PCI—a faster peripherals bus than the NuBus it replaces. The 9500 supports up to six PCI boards in two groups of three slots. Each group has its own PCI bridge chips, which handle synchronization and arbitration issues between peripherals (or

external buses) and the computer's main system bus. One of the bridge chips handles direct memory access (DMA), relieving the CPU of some of the burden of moving data around.

However, as this review was written (three weeks after the 9500 shipped), not many PCI cards were available. Our experiences so far with PCI have been mixed. (Macworld Lab was unable to obtain shipping versions of many announced PCI cards—we were able to test the 9500 only with late beta cards and the shipping ATI Xclaim GA card.) A prototype video card from Radius would not work in the upper three PCI slots on the 9500. Radius claims that the problem is with the DMA bridge chips on the upper bank of slots. Both Apple and Radius are looking into the problem. Unfortunately, only after more tests of shipping PCI cards will we know

whether a PCI card's slot placement in the 9500 makes any difference in its performance or compatibility.

Among prototype cards Macworld Lab tested, performance gains depended on the type of task. For example, video results with a late beta version of Radius's ThunderColor 30/1600 for PCI were only 9 seconds faster than results with a Thunder IV NuBus video card in an 8100/110. As for PCI's potential, we were able to transfer 160MB of data in only 14 seconds using dual FWB PCI Jack-Hammer prototypes with an 8GB RAID Level 0 array on an 8500/120 (see the feature "Power Mac: The Next Generation," in this issue).

According to some vendors, limitations in the Mac OS allow a maximum transfer rate of 45MB per second, far below the theoretical limit of 132 MBps, until Copland arrives.


KEVIN CANDLAND

The 9500 marks the shift to 70ns, 168-pin Dual In-line Memory Modules (DIMMs) for system RAM. DIMMs enable 64-bit transfers across the 9500's 64-bit data bus and CPU. The 9500 lets you install DIMMs one at a time, but if you install two identical DIMMs, the memory controller automatically interleaves the memory across these chips for a 10 to 15 percent performance increase. Macworld Lab found that performance increased only incrementally if some memory is interleaved but additional memory is not. (DIMM prices are competitive with current prices for SIMMs.)

Plug In Speed

More radically, Apple put the processor on a slotted card that can be easily removed and replaced. When faster 604 chips become available later this year, Apple plans to introduce an upgrade card that will accelerate the 120MHz or 132MHz system. Other manufacturers are also expected to introduce processor-replacement cards, and because Apple's design supports multiple processors, some accelerators will speed processing with two or more 604 chips.

The 9500 includes two SCSI buses: an internal SCSI-2 Fast bus capable of 10-Mbps data transfers, and an external 5-Mbps bus (with an additional internal connector). The 9500 also has a 10BaseT Ethernet connector (in addition to an AAUI connector) so you can more easily attach to Ethernet networks.

The 9500 has two striking omissions: no built-in video or built-in motion-video capture and playback capability. Apple anticipates that customers will buy accelerated video cards and high-performance video-capture cards from third parties. By the time you read this, several vendors will be shipping PCI cards in quantity.

Blazing Trails

We expected great performance from the 604-based machines, and the 9500 delivers. In Macworld Lab's system performance tests, the 9500/132 showed an average improvement of 47 percent over

the 8100/110. For instance, when compressing a 28MB Adobe Premiere movie, the 9500/132 took 16.5 minutes—a savings of 6.5 minutes over the 8100. Rendering an Infini-D model took 133 seconds on the 9500, 55 seconds less time than on the 8100. And more significant, duplicating a 15MB file in the Finder took 6.2 seconds compared with the 8100's 16.3 seconds—both using internal drives.

The new Mac OS 7.5.2, required on the 9500, incorporates a native version of the SCSI Manager that helps make transfers faster. The new system software allows 2-terabyte disk partitions, although files can still occupy only 2GB maximum, and small files still consume a disproportionately large amount of disk space because of allocation block limitations. Unfortunately, Mac OS 7.5.2 still has an emulated File Manager, so high-performance features such as multithreading and command queuing are not available. These limitations should be removed when Copland arrives.

The new operating system also incorporates a faster emulator called the Dynamic Recompilation Emulator (DRE). Unlike the earlier emulator, which translated 680X0 instructions one at a time, the DRE translates and recompiles commands in chunks, and caches them for later reuse. Macworld Lab tests show the DRE makes the 9500 faster than 68040 machines such as the Quadra 800 for all tasks except those that require heavy floating-point calculations.

Apple is further paving the way for Copland by including Open Transport—its new networking architecture—with Mac OS 7.5.2. While most people won't have much use for it now, in the future Open Transport should simplify switching among network protocols and make centralized network administration easier. When developers take advantage of several other changes to the operating system, we should see better performance, but the real potential lies in the 604 chip's unused power. Once software is optimized to exploit the chip's parallelism, the 604 is capable of performance

8 to 10 times greater than the 30 percent improvement seen with current software.

Dastardly Design

My biggest complaint is the design of the 9500/132 case. It is slightly taller than the Power Mac 8100/110 case: the external design is the same, and inside both models use the same molded-plastic, snap-together chassis to support the drives and power supply. As with the 8100, Quadra 800, and 840AV, you must remove the motherboard to install more RAM. The 9500/132 requires removing at least eight internal cables, all of the installed PCI cards, the processor daughtercard, every external cable except the power cable, a plastic power button (replacing the reset button of earlier models), and one screw before pulling the motherboard out. And PCI cards are harder to install and remove than NuBus cards: the new case has plastic tabs you must spread apart before inserting a PCI board, and then must tug into place so the boards stay put. The tabs get in the way at every step, and ultimately don't seem secure.

Like the 8100/110, the 9500 has two additional storage bays for half-height 3.5-inch drives—and poor access to the cables behind the drives.

The Last Word

Without question, the power of the 9500 is an enticing taste of what's to come from Apple in the next two years. However, should you buy a Power Macintosh 9500 now? If your expansion needs are modest and you want 604 speeds, I recommend you check out the recently announced Power Macintosh 8500/120. If you have the expandable Mac IIx or Quadra 950, the 9500 is a natural choice. Before you buy, however, check on the availability and compatibility of PCI cards. The full potential of the 9500 will not be realized until third-party hardware and software developers learn the ins and outs of both the PCI cards and the 9500. Ultimately, the only compelling reason to buy a 9500/132 is how much work it lets you do today.—TIM WARNER



Power Mac 9500/132: It Tops Them All

Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are in decreasing order of overall performance.



BEHIND OUR TESTS

Power Mac 9500 models include 512K built-in Level 2 cache. Other Power Macs include 256K cache. *Prerelease unit.

ClarisWorks 4.0

Integrated Productivity Software

PROS: Fast and well designed; low RAM requirements; fast word processor with new style-sheet feature; beefed-up database mode; dozens of other thoughtful improvements. **CONS:** Doesn't support System 7.5 drag and drop; still no Zmodem file-transfer option. **COMPANY:** Claris (408/727-8227). **LIST PRICE:** \$129.



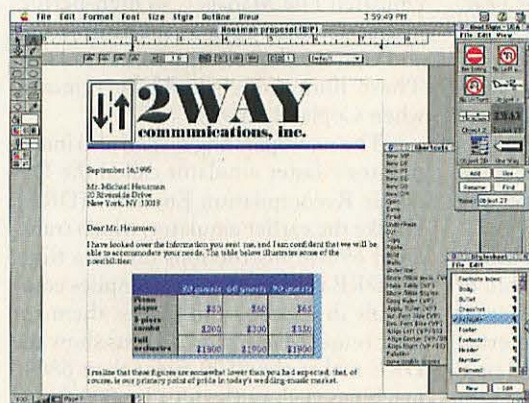
IT MUST HAVE BEEN DIFFICULT to design an upgrade of ClarisWorks, the best-selling all-in-one program with word processing, spreadsheet, database, painting, drawing, and modem communications features. After all, the program is famous for its clean design. How do you add features without cluttering it up and losing its simplicity, speed, and low hardware requirements?

Very carefully. As with previous upgrades, Claris has created ClarisWorks 4.0 by making dozens of delicate nips and tucks, not dramatic overhauls. Yet after only a few minutes, you become aware of the thought and intelligence behind the new features. For example, since most people spend a lot of time word processing, the best of 4.0 is in the word processor. You can divide your document into sections, each with its own page-numbering scheme, headers and footers, and footnote numbering. You can create an outline in the middle of a document (instead of turning the entire document into an outline). The word-count feature can now tally the words in just a selected patch of text.

To top it off, ClarisWorks 4.0 offers the planet's best style-sheet feature. A style, of course, is a predefined set of text attributes (bold 18-point Palatino, for example); by assigning styles to certain paragraphs of your manuscript, you ensure consistency—and convenience of redesign, since changing a style changes all the text in that style. But in ClarisWorks, styles can apply to every kind of data, not just text. For example, you can create a spreadsheet style that applies a color scheme to selected cells; a graphic style that applies, say, color and line-thickness settings to a selected object; an outline style that governs the numbering pattern; and so on. All this handiness is easily accessible from the slim, floating Stylesheet window.

ClarisWorks 4.0 offers more Assistants (automated online guides for cre-

ating standard documents—for instance, envelopes, certificates, newsletters, and mailing labels) than previous versions did. You answer a few questions—how many pages in the newsletter, for example—and the program generates a corresponding template document. Just replace the dummy headlines and import text into the boxes, and your design's complete. (ClarisWorks smoothly opens and saves 22 word processing file formats, including Microsoft Word 4 and 5, WordPerfect, and HTML [for designing World Wide Web pages].) Assistants are generally a joy, although you access them, confusingly, from two different menus.



Claris at Work The ClarisWorks 4.0 floating palettes: from top, the Library, Shortcuts (one-click access to common commands), and Stylesheet. Because they display English words, these palettes are far easier to understand than a tool bar full of cryptic icons, as you'd get in other programs. Still, a big monitor helps.

Together with the rich set of features from previous incarnations of the program—such as the thesaurus, spelling checker, zoom-in and zoom-out buttons, and automatic hyphenation—the new enhancements put ClarisWorks, suddenly, in a league with midrange dedicated word processors like WriteNow and MacWrite Pro. In that light, the omission of System 7.5 drag-and-drop features is surprising—and disappointing.

Other Enhancements

Virtually every annoyance has been removed from the database module: now you can view your data in a spreadsheet-like list view, as you do in Microsoft Works. When creating mailing labels, you can (at last) preview the printout on screen. You can preserve your frequently used search and sort requests, making it easy to call up with one click, say, all your outstanding invoices. Best of all, the ClarisWorks database has inherited from its sibling, FileMaker, several data-input

options: check boxes, radio buttons, and pop-up menus, for example. These flexible controls make almost any database layout more functional—and they even show up in the list view.

The drawing and painting modes benefit enormously from another new feature: the Library, a floating palette of thumbnail representations of artwork. Not only does the Library provide a convenient WYSIWYG serving tray for the hundreds of clip-art images included with ClarisWorks, but it's also a perfect place for storing your own logo, letterhead, signature, and so on. One click in the Library inserts the selected item into your document. It gets better: in a typical burst of innovation, Claris designed the Library to hold text passages and chunks of spreadsheet cells, too, turning it into a kind of all-media glossary. You can create as many Library files as you want, and it's simple to rename, sort, delete, duplicate, cut, and paste Library elements.

The telecom module of ClarisWorks has been left essentially untouched. Unfortunately, that means you still can't send or receive files using the quick, intelligent Zmodem method.

The most impressive feature of ClarisWorks 4.0, however, isn't a change at all: it's that there's *no* change in what counts—speed and low hardware requirements. ClarisWorks feels nimble and powerful, whether on a Power Mac (it's native) or on a 68020-based Mac (the minimum required). Such responsive software is all too rare in today's world of behemoth applications. Better yet, ClarisWorks still needs only 1400K of RAM. And with its copious, well-illustrated online help and self-explanatory design, you spend your time doing things, not figuring out how to do them.

The Last Word

ClarisWorks is clearly the best integrated program available. Version 4.0's word processor and database components can even stand up to the stand-alone programs of the same type. The program's clean, good-looking interface helps you combine elements on a single page: adding your logo to a spreadsheet printout, dressing up a letter with a table and border, and so on. Macros and new AppleScript features should make ClarisWorks interesting even to power users. And at \$129 list, it would be hard to imagine a better software value.—DAVID POGUE

Poser 1.0

3-D-Illustration Power Tool

PROS: Easy to learn and use; many figure types; extendable libraries of poses, bodies, lights, and cameras; speedy performance; multiple file-export formats. **CONS:** Limited control of joints; hands limited to five set positions; cannot render selectively. **COMPANY:** Fractal Design (408/668-5300). **LIST PRICE:** \$199.



POSER IS A GRAPHIC ARTIST'S TOOL with one function: to generate precisely scaled, three-dimensional human figures—a perennial stumbling block for many graphic artists. In some ways Poser represents a departure for Fractal Design, a company known for its "natural media" digital art programs Painter, Sketcher, and Dabbler. On the other hand, in combining powerful graphics capabilities with an appealing interface that's simple enough for casual users but expands to provide additional controls for professionals, Poser is right in step with Fractal's other products.

Although Poser is a stand-alone application, it's really a highly specialized power tool, intended as a companion to other graphics programs. Like any modeler, it includes lighting and camera controls and several basic rendering styles, but its powers are tuned entirely for creating human figures. The lighting and surface-rendering functions are mainly visualization aids. Most professional users will export Poser models in PICT to 2-D image-editors, or in RIB or DXF format to CAD or scene modelers for more-elaborate 3-D rendering.

For a professional tool, Poser makes very modest RAM and processing-power demands; it requires either a Power Mac or a Macintosh with a math coprocessor, and 6MB of RAM. Any graphics product capable of producing complex 3-D effects performs noticeably better the more RAM you give it; but Poser's ability to perform well with only 6MB means a digital artist might easily use it alongside an image-editing application such as Fractal Design Painter or Adobe Photoshop, or a modeling animation program such as Ray Dream Designer, Strata Vision 3d, or Specular International Infini-D. In fact, Poser's manual devotes an eight-page appendix to recommended techniques for using Poser with other programs. The program is reasonably list priced at \$199.

Positions, Everybody

You begin by selecting your model's sex and style (body, stick figure, or mannequin) and the type of display you want to work with—from a simple silhouette or outline to the more detailed wire-frame or flat-shaded display—from the Display menu. You are presented with an upright figure with its feet together and arms outstretched. You can work with more than one model in the space, selectively hiding and showing each one. But whatever rendering option you choose applies to all figures; you can't render individual models or parts differently.

The main Tools palette gives you access to camera and lighting controls, as well as your choice of Body or Pose mode. Four camera views show you the figure from different perspectives. (Your preferences for the work environment dictate such things as whether horizon and perspective lines appear, and what the colors of your work space and model are.)

The Body mode lets you position the figure in space—moving, twisting, and rotating the whole model without affecting the relative positions of the individual body parts.

Pose mode gives you tools for raising, lowering, and rotating parts of the body. You simply click on the part you want to move, or choose it from a pop-up menu. Several tools work to translate motion naturally: extend the model's hand, and

if you could simply grab a model's elbow to raise its arm, and have the rest of the arm behave as if controlled by gravity and real muscles, but this kind of realistic motion would demand lots of processing power (and probably cost a lot more).

Poser comes with an extendable library of poses, so, for example, you could base the pose of a female figure on a model of Rodin's *The Thinker* or Michelangelo's *David*.

Something in an Extra-Large, Perhaps?

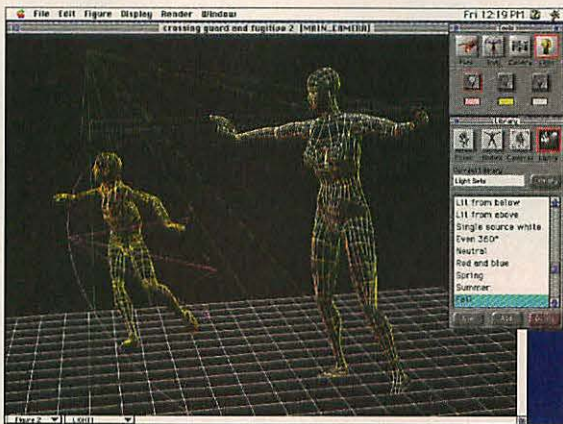
The male and female figures are well proportioned—both as adults and in the various stages of infancy, childhood, and youth. The extendable Bodies library lets you slim a model down or give it more heft—all the way from 20 pounds under average weight to 50 pounds over.

These are well and good as long as you want to make realistic people. What about Batman and Catwoman? Or Barbie and Ken? Or some distorted phantasm from your dreams? Not a problem. You can select model or heroic proportions for either sex, or use scaling tools or parameter dials to make body parts as bizarre as you want. You cannot, however, manipulate or add points to a figure's surface mesh for finer deformations of the shape.

Having shaped the figure, you can select a smooth or muscled rendering style and apply a surface texture. The program supports imported texture maps and bump maps, but you're likely to do most of your finishing work using an image editor or a more powerful modeler. You can adjust camera views and color, and position three variable light sources, or choose preset options from the Light and Camera libraries.

The Last Word

While Poser lacks fine detail for shaping hands (beyond five supplied poses) and facial features, it takes care of some of the most difficult aspects of figure drawing—proportion, perspective, and shading. In short, Poser makes it easy for professionals to create lifelike figures quickly—and without forking out a model's fee. With its reasonable price, relatively modest requirements, well-designed interface, and entertaining tutorial, even weekend artists will be drawn to Poser.—MARJORIE BAER



Safe Crossing These two wire-frame figures—one adult female, one male adolescent—are set in the same work space, with horizon and perspective lines to help define relative scale. The running child was modified from the Fugitive figure in the Poses library, and the lighting simulates autumn daylight.

the shoulders shift and the waist twists. A palette of parameter controls lets you fine-tune each of the model's 17 movable parts (the head, neck, chest, abdomen, and hips, plus a separate control for each foot, shin, thigh, hand, forearm, and shoulder), but it's still tricky to achieve a really natural position. It would be nice

Your brain.

Your style.

Your way.

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Create special effects by softening or feathering with the eraser. Cool!

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How are you supposed to DRAW WITH A MOUSE? IT FEELS LIKE A BRICK! Get our

ArtPad II™ graphics tablet with the awesome new Erasing UltraPen™. It's the only pen that's cordless, batteryless and pressure-sensitive, and the only one with an eraser built right in. Which means it's amazingly easy and natural to use. Buy it bundled with Fractal Design's Dabbler, and you've got a great deal that'll let you draw, paint, or just flat-out create, the same way you always have since you first learned to pick up a crayon and make trouble. The ArtPad II with Erasing UltraPen. It senses every move you make. And it works on any computer you've got, five minutes out of the box.

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Bundled software may vary.



Internet Server Solution for WWW

Web Server

PROS: Ideally suited for small-business sites; Mac's ease of use simplifies Internet publishing.

CONS: Processor-intensive Internet functions or in-depth searches can slow server significantly; skimpy paper documentation.

COMPANY: Apple Computer (408/996-1010).

COMPANY'S ESTIMATED PRICE: \$2909.



FORCED INTO THE ARCAINE AND frustrating world of Unix, the first publishers on the Web had to become network technicians, learning to speak a foreign language of TCP/IP, data packets, and CGI (Common Gateway Interface) scripting. Enter the Apple Internet Server Solution for the World Wide Web, a hardware-and-software bundle that's meant to be an all-in-one package. While it's not an ideal solution for all types of Internet publishing, it's a starting place for people who want to be publishers, not technicians.

The Software Bundle

The core applications in the software bundle are mostly third-party products, including StarNine's WebStar (formerly MacHTTP), for serving Web HTML files over the Internet; Netscape Communications' Netscape Navigator 1.1, for browsing those files; and Bare Bones Software's BBEdit, for writing them. Apple includes AppleSearch 1.5, AppleScript, and Apple RAID software. Also bundled are Adobe Acrobat Pro and a few CGI tools for integrating Web pages with resources such as E-mail, databases, and search engines. You can get most of this software separately, but it would cost more.

I evaluated the software using Apple's Workgroup Server 6150/66. Apple also offers the Internet Server Solution in two other Power Mac Workgroup Server configurations: the 110MHz 8150 and the 120MHz 9150.

Setting Up the Server

The WebStar software needs only 1MB to 2.5MB of the 16MB of RAM that ships with the Apple Workgroup Server, leaving you enough RAM for search engines, databases, or other Web tools. After you've launched WebStar, your Mac is able to serve text-based HTML files, as well as graphics, sound, and QuickTime.

If you've ever administered a basic Mac network server, you'll feel comfort-

able with the WebStar software. I used the default settings for most of my WebStar configuration and made changes using an AppleShare-like interface, simple dialog boxes, and check boxes. If you're new to Mac networks or servers, you'll need to spend a little time with the documentation. Unfortunately, it's mostly digital, in HTML format—only the Apple software includes paper documentation. Still, most of the software is easy to use, and you shouldn't need to spend much time clicking through the files.

The package stands out in cost and ease of use. The Internet Server Solution starts at about half the price of most low-cost Unix servers. And on a Unix server, you can spend as much time placing and organizing your Web files as you do creating the content. WebStar provides a simpler way to manage your Web site's organization, security, and administra-



ROBERT PERRY

tion, especially if you already have a Mac-based publishing system. I created a test site of simple Web pages, set up AppleSearch indexes of those files and other WAIS databases, and created an interface to search them, all in one afternoon.

WebStar's security features are similar to AppleShare's, allowing access only to files and directories that you designate. Access can also be configured by group, IP address, and/or single user names. I created public and private areas for a test Web site that used password authentication and IP-address filtering to keep private files private.

For secure transactions, WebStar supports Netscape Communications' security solution, Secure Sockets Layer (SSL). The Mac OS has fewer security holes than Unix does, but you should still consider isolating a Web server if your LAN contains sensitive files.

Most of the software in the bundle is Power Mac native, with the important exception of AppleScript. AppleScript provides a crucial link between WebStar and some of the interactive aspects, such

as searches and forms. On a Power Mac those scripts run in emulation, meaning a slowdown for your server. The preferred method involves CGIs that will run in native Power Mac code. Currently, only a handful of these applications are available for the Mac.

The Web has traditionally relied on Unix servers for their ability to intelligently shuffle time on the machine's CPU, or across multiple CPUs, to serve multiple user requests—a process called multitasking. The current Mac OS lacks true multitasking, and WebStar makes do with a less efficient substitute called the Threads Manager. Processor-intensive activities, such as AppleScripts, may slow down the server during heavy usage, resulting in a busy signal for other users.

Connecting to the Internet

I put the server onto the Internet via a complicated network without much fuss. Although the security precautions entailed some work, in essence all I needed to do was configure the MacTCP control panel with a spare IP (Internet Protocol) address from my Internet service provider. If you aren't already connected to the Internet, you'll need to arrange a dedicated connection with your own local provider. You'll also need the service provider to handle your Domain Name Service; this makes your site visible to the world as yourserver.com and not just as the numeric IP address.

The Last Word

The Mac's current inability to perform true multitasking—and the fact that AppleScript is not Power Mac native—limits my recommending the Apple Internet Server Solution as a Web server for complex Internet sites. If you need intricate scripting, expect heavy database searching, or intend to provide some of the multimedia capabilities that the Web will offer in the next year, a Unix server might be a better choice. But small businesses establishing a modest site offering product info and simple interactive forms will find the Mac to be more cost-effective than a Unix machine. You could even run two or three Macs in tandem to spread the work load around.

Above all, the WebStar software and the Mac's ease of use make the Apple Internet Server Solution a good solution until the Mac hardware offers true multitasking, native scripting, and processing power that matches the speed of current Unix workstations.—MATTHEW HAWN

MapInfo 3.0

Mapping Software

PROS: Advanced geographic-analysis and geocoding tools; excellent presentation tools.

CONS: Expensive; editing layered maps is tedious. **COMPANY:** MapInfo Corporation (518/285-6000). **LIST PRICE:** \$1295.



EXTRACTING INFORMATION from large computer databases usually leaves you staring at rows and columns of data in a spreadsheet

program, but databases often contain geographic information (like customer addresses) screaming to be liberated from these confines. MapInfo 3.0 provides the tools for displaying and manipulating data in the form of digital maps. Unlike CD-ROM atlases that merely present a street map, MapInfo allows you to edit maps, layer several maps, conduct spatial analyses, and geocode (assign *x* and *y* coordinates to) the geographical data in your database so it appears on your map.

MapInfo is Power Mac native with a minimum RAM requirement of 6.5MB, and while the MapInfo application occupies a scant 4.1MB on your hard disk—plus another 7MB if you load the included sample data that allows you to begin experimenting immediately—you'll need to allocate more disk space for the data packages, which you must purchase separately. For instance, MapInfo Corporation produces StreetInfo packages, which contain digital street maps (complete with addresses and landmarks) at the county level (\$225), state level (\$995), regional level (\$2995), and national level (\$5000). Several third-party vendors produce data packages in the MapInfo format, including maps coded with demographic data.

Editing and Geocoding

Even though MapInfo allows you to trace paper maps on a digitizing tablet, this feature is useful for creating only the most basic of maps since it lacks the splines, smoothing, assisted node entry, and so on, of good CAD programs. It's best to begin a MapInfo project by opening a base map that's already coded with information. For instance, you can purchase a data package containing a map with street names, address ranges, and major landmarks.

You can use the tools on MapInfo's two floating tool palettes to edit and

query maps. For instance, you can use the line tool to add a new street or to add a dashed line representing a proposed highway. Using the polygon tool, you can draw blocks that represent a city's voting precincts or zip code areas, or that delineate marketing areas for a business. The Info tool allows you to click on a map object to display data, so that clicking on an intersection displays the street names, or clicking on a street segment shows the range of addresses for that block.

You can layer maps to create more-complex depictions of an area. Unfortunately, to change the colors, symbols, and stacking order of layered maps, you must open the Layer Control dialog box each time you make a change in the map-display window; another floating palette containing layer-control commands would be more efficient.

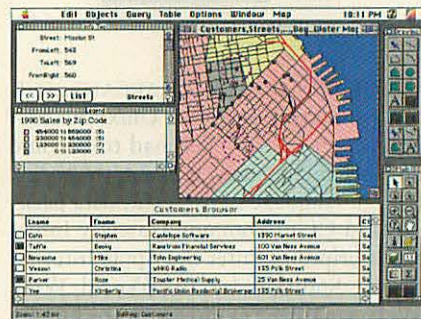
Once you have tailored an appropriate base map, you can use MapInfo to make your own data appear on the map by a process known as geocoding. Each record in the database that you want to geocode must contain some type of geographic reference—such as a street address or a pair of latitude and longitude coordinates—that allows MapInfo to identify the appropriate location on the map, marking the spot with a symbol of your choice. For instance, MapInfo could read each address in a database of customers (or read a partial list depending on criteria you set), scan your base map for the appropriate street names and address ranges, and place a house symbol on the map to mark each customer's location. The program also features a useful interactive-geocoding mode that alerts you when it can't find a data record's location on the map—useful if a record includes a typo, or if a city has two streets of the same name.

Working with Maps

Once you have geocoded all your data, you could create what MapInfo calls thematic maps, which illustrate the distribution of one or more variables (see "A Place on the Map"). For instance, a thematic map could simultaneously display average income level and infant-mortality rates. Or if your customer database contains purchasing-history information, MapInfo allows you to build complex expressions that would, for example, highlight on a map all customers in a particular state who spent more than \$5000 on goods in 1995.

MapInfo also features a number of tools for performing spatial analysis, such as identifying a set of locations that lie within (or beyond) a certain distance from another set of locations. For instance, to determine which of your customers live within a 2-mile radius of one of your retail stores, you could define a buffer—a sort of graphic halo—that circumscribes each customer address and each store location, then you could inspect where the buffers overlap on your map.

MapInfo 3.0's extensive set of tools for performing geographic analysis on



A Place on the Map MapInfo 3.0 can turn a drab customer database into a resource for powerful analysis and colorful presentation.

polygons place it ahead of the pack. One useful option is the aggregation of small polygons into larger ones on the basis of a common field; for example, you could patch zip codes together to form larger sales or marketing areas for a business. You can also use a polygon from one map layer as a cookie cutter on another map layer, splitting or erasing target features along the boundary of the cookie cutter. This is particularly useful when you need to divide established areas, such as counties, into smaller units. Unfortunately, this technique works best when the cookie cutter is a single polygon; otherwise, MapInfo can get bogged down processing the request.

MapInfo truly shines in its ability to create attractive presentation maps that include data tables, graphs, and legends. A few small features are still lacking—for example, the ability to include common cartographic features like scale bars and north arrows.

The Last Word

While advanced users will find an admirable array of sophisticated analytical tools in the package, MapInfo 3.0 is particularly strong on features that beginning desktop mappers are likely to use most: geocoding data, creating thematic maps, and producing presentation graphics. MapInfo takes desktop mapping out of the research lab and brings it into the business office.—KARL GOLDSTEIN

Introducing Windows 95.
It lets you drop files anywhere
you want on the desktop.

Imagine that.



AppWare 1.2

Application-Development System

PROS: Allows speedy application development; easy-to-use graphical programming method; good Mac/Windows cross-platform capabilities.

CONS: Compiled apps are large; interface requires too much scrolling. **COMPANY:** Novell (801/429-7000). **LIST PRICE:** \$495.



THE TYPICAL GRAPHICAL USER interface requires pages and pages of code; a simple desk accessory such as Note Pad printed out in C-language code would be the size of a small book. Since Macintosh programs tend to have many similar parts (there's always a Copy command under the Edit menu, for example), programmers have sought to use libraries of prepared code to simplify and speed up programming. Although class libraries, in the hands of experienced programmers, approach this goal, they aren't conducive to rapid prototyping, nor do they offer an easy introduction to programming for beginners.

Novell's AppWare 1.2 offers professional and novice programmers an efficient, graphical method of application development. AppWare is predicated on AppWare Loadable Modules (ALMs)—prefabricated objects and functions that are presented as icons on the Object & Function palette. Each ALM consists of the programming code necessary to create an interface object or execute a function, so as you arrange and link ALM icons you're actually connecting blocks of code that AppWare later compiles into an application.

Serius Developer (the predecessor to AppWare, acquired by Novell) and Pictorius's Prograph CPX produced a graphical approach to programming before, but AppWare is easier to use.

AppBuilding

AppWare presents you with a Project window in which to assemble an application. You organize a project into Subjects—sets of objects and functions—for each facet of your application. For instance, you can create a Subject (containing interface and code) for each of the pull-down command menus you want in the application. (Subjects can also contain collections of menus; a single Subject could, for example, contain the interface and code for typical File and Edit command menus.)

You build a Subject by first dragging Object icons from the Object & Function palette into the Subject window and then defining what each object does using the function icons (see "Objective and Functional"). To generate a typical Edit menu, for example, you drag one Menu icon and four MenuItem icons from the Object portion of the palette, then you name the MenuItem icons Cut, Copy, and so forth, and link them to appropriate functions that you select from the Function area.

Application development in AppWare, however, extends much further than designing command menus. For instance, you can use the Database ALM as a building block for quickly creating not only a complete flat-file database, but also a relational database.

The breadth of ALMs that AppWare supplies is impressive, providing much latitude in the types of applications that you can build: multimedia modules for developing movie and sound applications, Oracle objects for designing custom user interfaces for Oracle databases, Apple-event objects for linking your custom applications with other programs. If none of the 600 ALMs that ship with AppWare fulfill your needs, you can use ALM Builder (which is included in the package) to build your own ALMs, although this process requires the use of traditional program coding.

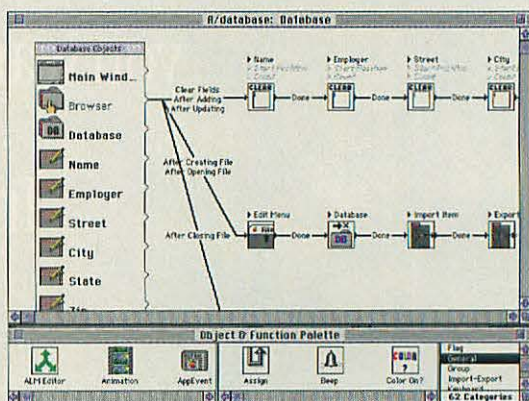
The AppWare package includes Macintosh and Windows versions of the program, and most of the ALMs come in both flavors, which facilitates porting applications across platforms. However, you will need to tweak the interface of a Macintosh application ported to Windows (for instance, they call it Exit, we call it Quit).

The authors of Revelar Software's ConstructionMac 3.0 testify to the ease and speed that AppWare brings to programming, claiming that the program reduced their coding time by 75 percent. A number of Fortune 500 companies also use AppWare, mainly for building database-query and executive-information systems. (It is noteworthy that these companies use AppWare rather than the many possible front-end tools that are available from database vendors.)

The Trade-Off

Traditionally, icon-based programming systems have produced applications that are too big and too slow to be practical. AppWare applications are fairly large for their level of functionality—a modest communications-terminal application takes up nearly 400K—but at least they're fast. As a rule of thumb, a compiled AppWare application is about twice as large as the equivalent program written in C++, but the AppWare version takes less than half the time to write—in many circumstances, this is quite an acceptable trade-off.

To access AppWare's ALMs, you have to scroll through a list of categories, then objects, and then functions—and each of these lists can be lengthy. Novell should integrate keyboard shortcuts to simplify navigating the numerous ALMs, so that, for instance, pressing the H key



Objective and Functional To make an AppWare application, you drag object icons from the left-hand portion of the Object & Function palette to the Subject window. Then you define the operation of objects by dragging icons from the right-hand, or Function, portion of the palette. When you're done, AppWare compiles the Subjects into an application.

on your keyboard would take you to the first item beginning with that letter.

As often happens in icon-heavy programs, some of the icons are far from self-explanatory. AppWare's user guide is helpful but too brief; a more annoying problem is that screen shots in the manual occasionally don't correspond with version 1.2.

The Last Word

AppWare is great for developing both commercial stand-alone applications and in-house custom applications. Though it can't match the efficiency of traditional programming languages (just as these are less efficient than assembly languages), AppWare does deliver excellent ease of use without much code compromise. It's worth a look, whether you're a novice programmer or a hard-bitten old C dog.

—CHARLES SEITER

Introducing Windows 95.

It has a trash can you can open
and take things back out of again.

Imagine that.



JAM 6

Client-Server Development Tools

PROS: Rapid development of robust client applications; excellent documentation and support; automatic cross-platform application generation.

CONS: Slow interactions with repository; follows many Unix conventions. **COMPANY:** JYACC. (212/267-7722). **LIST PRICE:** \$2000.



ORIGINALLY, RELATIONAL DATABASES were designed to run on mainframes. Users communicated directly with the mainframe through a "dumb" character-based terminal. Since the first desktop PCs had negligible computing power compared with a mainframe, this style of computing dominated most large database applications until three years ago. Then, as PCs zoomed ahead in power, developers realized that they could transfer much of the database workload from mainframe or minicomputer servers to client desktop computers. In the database world, client-server systems now seem to be universally accepted as the future of computing.

With a little ingenuity and the right tools, it's possible to optimize system throughput by a judicious partitioning of tasks between the big system that acts as a central data-storage facility and the smaller but still powerful desktop systems. From a hardware standpoint, this redistribution of database chores makes sense—a Power Mac 8100/100 is as powerful as the mainframe servers of previous decades, so it should do something besides merely sending characters down a wire to a central computer.

Mac Tools, at Last

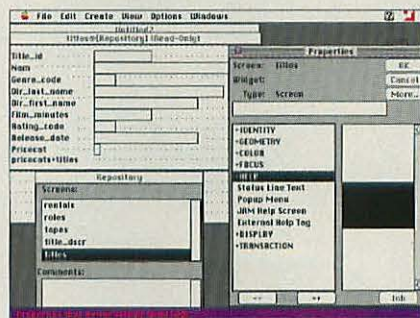
There are a few traditional Mac-based client-server development tools, notably Omnis 3 and 4th Dimension. In the rest of the world, however, the big vendor names in this area are PowerSoft, Oracle, Gupta, Forté, Uniface, and JYACC. All these companies are currently working on Macintosh tools, but the first into the Macintosh market with a complete development system (comparable to what's offered on other platforms) is JYACC, a pioneering client-server company whose customers include the United Nations, Interleaf, and AT&T.

JYACC's JAM 6 package (JAM stands for JYACC Application Manager) includes an application tool kit, a relational database (called JDB) for creating pro-

totypes, and a report writer. In real life, JAM users are likely to develop front ends to databases from Oracle, Sybase, Computer Associates (Ingres), IBM (DB2), or Informix; JDB is provided as a prototyping database so you can develop and test applications using just a Mac and a specification for the relational server database (modeling the server database on the Mac). The application tool kit includes a graphical screen editor, a menu-bar editor, a styles editor for screen elements, and facilities for generating the SQL (structured query language) queries that all the major relational databases use for data manipulation.

Objects on the Table

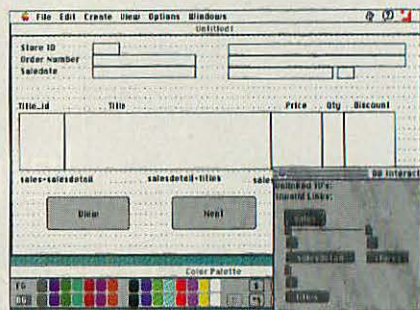
To use JAM, you first look at the fields and the table structure of the database. You then create a repository of screen objects. These objects are usually labels and widgets (data elements) corresponding to the components of the database. You then use the objects in the repository—along with palettes of screen elements (buttons, toggles, check boxes, lists, pop-ups)—to build the screens that constitute the user interface of a JAM client application (see "Objects Reposing"). Screen objects inherit the properties of their parent objects in the repository, making it easy to propagate style and data-linkage changes across a whole set of screens. It's possible to call up an



Objects Reposing All object properties are easily modified in JAM with menu choices in the Properties window.

explicit relational linkage map for the underlying data for each screen, and you can change links graphically if necessary (see "Public Relations"). It's also possible to define actions for buttons, corresponding to complex SQL SELECT, INSERT, or UPDATE commands, just by making selections in dialog boxes in JAM's SQL generator. Similarly, to develop transaction processing you select data objects on the screen and then make simple choices from the JAM Transaction menu that show how the information in these objects should be updated during transactions.

This may sound like codeless programming, and it is—almost. But to get individual screens in an application communicating with each other, you must typically write little two- or three-line patches in JPL (JYACC Procedural Language). Coding in JPL or C also lets you take advantage of other special JAM features for interaction with server databases. This much programming won't dis-



Public Relations The little window, lower right, shows the relational links between the data elements in this sales form. You can also change the links in this window.

courage the database professionals who are JAM's target market, and in any case JYACC includes great documentation; truly helpful support; and a consulting service that gets frequent use on big, Fortune 500-level jobs.

The only drawbacks of JAM as a Macintosh product are the relatively large application size (the performance of the finished app is good, though), annoyingly slow modification of repository objects in development, and the assumption that you're familiar with many Unix and Windows conventions. The latter, however, is probably a reasonable assumption if you're trying to produce client-server applications for the big world beyond the Mac. It's assumed that that's your intent in using JAM—code that has been developed on the Macintosh can be used immediately in a JAM environment in OS/2, Motif, and different types of Windows. JAM handles the screen conventions automatically, producing gray Windows 3-D buttons on the Windows side and traditional black-and-white rectangle buttons on the Mac side.

The Last Word

The release of JAM 6 for the Macintosh is an important event, making the Mac a viable platform for development of large-scale corporate client-server database applications. JAM is easy to use, well supported, and admirably complete. Soon JAM will have competitors from other vendors, but right now JYACC has the high-end Mac client-server market to itself.—CHARLES SEITER

Introducing Windows 95.
It lets you use more than eight
characters to name your files.

Imagine that.



KPT Vector Effects 1.0

Object-Oriented Filter Collection

PROS: Supremely flexible interface; distortion options move points and modify control handles to ensure smooth paths; point-positioning and color-correction filters excellent for Illustrator use.

CONS: Preview functions could use some work; requires an FPU. **COMPANY:** HSC Software (805/566-6200). **LIST PRICE:** \$199.



KPT VECTOR EFFECTS IS A COLLECTION of plug-in modules that work with both Illustrator and Macromedia FreeHand, versions 5.0 and later. Originally developed under the name Sree's Cool Tools, the 13 Vector Effects filters go well beyond the largely uninspired and underpowered plug-ins that Adobe distributes with Illustrator 5.5. Few Illustrator users will want to miss out on this imaginative and thoughtful collection of object-oriented plug-in tools, and though FreeHand folks derive slightly less benefit—one Vector Effects filter (ShatterBox) is incompatible with FreeHand and a couple others duplicate functions already found in the venerable draw program—KPT Vector Effects is still a worthwhile purchase.

Interface of Your Dreams

The Vector Effects interface is easily the most thoughtful I've come across in any new program this year. I'm not talking about screen fluff—like the animated buttons—but rather the extraordinary care that's been taken to anticipate your needs and address a wide range of working habits. Each filter dialog box contains a wire-frame preview of the selected object, which you can zoom and scroll. Like Illustrator and FreeHand, Vector Effects offers multiple levels of undo and redo, going so far as to implement the keyboard equivalents native to the host program. As with KPT Convolver, you can adjust numerical values by dragging from buttons that serve as invisible slider bars. But the values are absolute, not relative, giving them real meaning and providing you with a point of reference. Better still, you can edit the values from the keyboard by tabbing from one option to the next, and you can display all numerical values at once by pressing option-tab.

But that's just the beginning. As with Kai's Power Tools, you can select from predefined settings inside many filters and save your own settings for later use.

Unlike any previous filter collection, however, Vector Effects lets you preview predefined effects in a graphical pop-up menu. You can even preview the effect of the settings on selected objects by pressing the ⌘ key. And for those folks who appreciate built-in help, Vector Effects provides balloon help right inside the dialog box (though, alas, there is no keyboard equivalent). The balloons even point you to specific pages in the documentation.

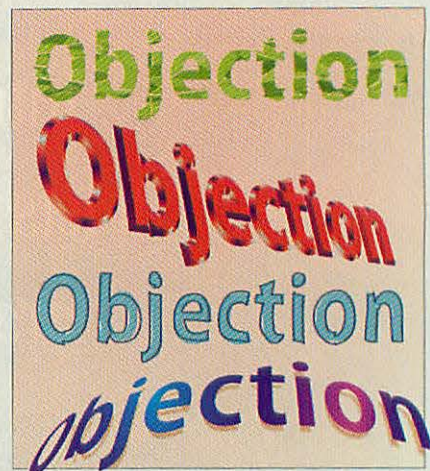
The Filter Lineup

The filters themselves are varied and generous, taking up where your illustration application's native capabilities leave off. The Warp Frame filter, for example, allows you to bow selected objects inward and outward, an effect sometimes known as enveloping. The Vector Distort filter lets you apply multiple distortion effects, including twirling, spherizing, and zig-zags. You can even integrate saved effects created with the Warp Frame filter. Both Warp Frame and Vector Distort work their magic without adding a single point to your paths. Rather, they distort the segments by intelligently modifying the positions of Bézier control handles. This is object manipulation at its best.

Other Vector Effects filters offer 3-D rotating, perspective, and beveling effects, as well as automatic shadows, flares, and calligraphic outlines. But Illustrator users will probably most appreciate the point-positioning and color-correction filters. Using the Point Editor plug-in, you can specify the precise coordinate location of any point in any path. You can even reposition control handles. The Color-Tweak filter brings Photoshop-like color-modification controls to the world of objects. You can change hue, saturation, and brightness, and even convert a color illustration to gray scale. You'll never have to redraw a blend again. (For the record, FreeHand 5 provides all the coordinate-point-positioning options you need, as well as a fairly robust collection of color-correction commands.)

If you find any fault with Vector Effects, it will likely be in the areas of previewing, gradients, and grouping. Vector Effects' preview capabilities are good but leave room for improvement. Only a couple of dialog boxes permit you to view effects in the context of deselected artwork. Most filters are limited to wire-frame previews, and the ShatterBox filter doesn't even go that far. Some folks may also be disappointed by the fact that the filters ignore gradient fills. For example,

you won't be happy with shadows created against gradient backgrounds, and you can't edit gradient fills with the Color-Tweak filter. The filters don't always group objects as you'd expect. For example, if you apply the ShadowLand filter to grouped objects, the shadows become part of the group. I'd prefer the shadows to be a separate group—perhaps within a larger group that includes the original objects—so you could transform the original objects and the shadows indepen-



Object Lessons After converting a word to an editable path, I tested five of KPT Vector Effects' filters. I applied, from top to bottom, ShatterBox, 3D Transform, Sketch, and Vector Distort and ShadowLand filters. If you look closely, you can see that the 3D Transform filter inaccurately splayed the beveling in the cusps of the *b* and *n*. And the ShadowLand filter can't quite account for the gradient background, resulting in halos around some of the letter shadows. But these are minor irregularities.

dently. Another filter, Sketch, would save steps if it grouped interior shapes separately from traced outlines so you could easily manipulate the colors of each later on. And finally, like Illustrator's Pathfinder filters, KPT Vector Effects requires that your Mac be equipped with an FPU. But these are minor flaws you can anticipate and work around.

The Last Word

Blessed with an inspired interface and a wealth of helpful and well-executed capabilities, KPT Vector Effects brings a new level of functionality to the drawing experience. It lets you edit objects with the same degree of flexibility that you previously may have associated strictly with pixel-based images. I find these filters more useful than any other filter collection I've seen. Adding Vector Effects to your favorite draw program brings as many new features as a whole-number upgrade, and that's saying a lot.

—DEKE MCCLELLAND

Imagine this.



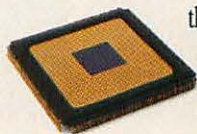
For people who don't use a Macintosh[®] computer, the most significant development in years has finally arrived. It's very big news. It's called Windows 95.

Yes, Windows 95 makes it easier for people to use their computers. It's a little more graphical. A little more intuitive. It even has a trash can.

In short, it makes a PC more like a Macintosh — you know, the Macintosh we built back in 1984. But compare a PC running Windows 95 to the Macintosh of 1995, and you'll discover a decade of difference.

A new kind of power.

In a recent independent study, for example, the RISC-based Power Macintosh[™] 9500 outperformed a 120 MHz Pentium-processor-based PC running Windows by 63% on average. When running scientific and technical applications,



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tive help system that doesn't just answer your questions, but shows you what to do, where to click and what to type to get things done. And why we make it so easy to create Internet connections, install multimedia software and set up entire new networks from scratch.

The way beyond multimedia.

For many of the companies that design and manufacture PCs (or write operating systems for them), the biggest challenge of all is simply getting multimedia to work.

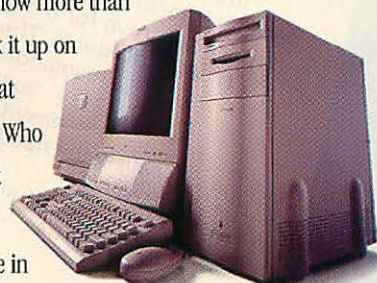
Meanwhile, ordinary people who turn on a Power Mac can do a lot more than run snappy new multimedia titles. They can create 3-D graphics, use voice recognition, videoconference across continents, even get started with virtual reality — all at the touch of a few keys and a click of a mouse. Because you can get these so-called "future" technologies in a Power Macintosh, today.**



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The next time you hear the skeptics say, "But a Macintosh won't run the software we need," tell them this: There's now a Macintosh — the Power Macintosh 6100/66 DOS Compatible, to be specific — that runs everything a Macintosh can run, *plus* thousands of programs for Windows and DOS. Then, if they ask you about hardware compatibility, tell them how the PCI slots built into the new Power Mac accept standard PCI cards.

If they want to know more than that, tell them to look it up on the World Wide Web, at <http://www.apple.com>. Who knows, they just might get a peek at what Windows will look like in another decade or so. Imagine that.



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Circle 74 on reader service card

GeoPort Telecom Adapter Kit

Telecommunications

PROS: Unlocks the software modem built into 680X0 AV and Power Macs; provides voice, data, and fax services. **CONS:** Poor OCR quality of fax software; OCR function works erratically on low-memory Macs; full version of MegaPhone telephony software costs extra. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$129.95.



IF YOU OWN A 680X0 AV MAC OR A Power Mac, you have a secret modem concealed inside your computer; Apple calls it GeoPort. Unfortunately, you haven't had good access to this modem until Apple's recent release of the GeoPort Telecom Adapter Kit, which includes the hardware and software necessary to use all GeoPort's features. The kit bundles the GeoPort Telecom Adapter unit with Apple's Fax Terminal and Fax Sender software, Aladdin Systems' SITcomm SE/GTA terminal-emulation and BBS-access software, and Cypress Research's MegaPhone telephony software. (Those who already own the GeoPort Telecom Adapter can download this software from the major online services and Apple's Internet site—<http://www.info.apple.com>.)

The bundled software allows you to use your computer not only as a fax machine, but also as a telephone and as an answering machine; however, throughput-thirsty individuals won't be happy traveling at GeoPort's slow 14.4-Kbps connection rate.

Geo-What?

GeoPort isn't a separate port on your computer; it's a sort of software modem provided by a Power Mac's CPU (and by a separate digital signal processor in 680X0 AV Macs) that's controlled by Apple's Telecom 2.0 software.

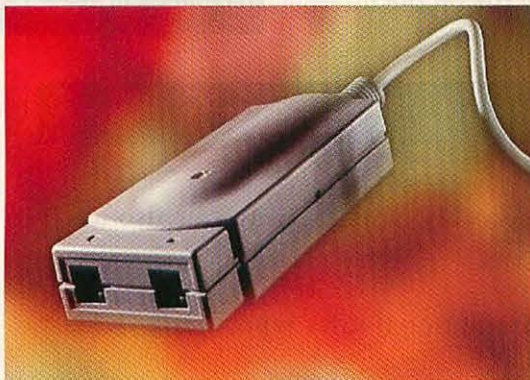
To access this modem, you need the GeoPort Telecom Adapter unit, which connects your computer's high-speed modem port and a telephone jack, converting the computer's digital data into the analog noise transmitted over telephone lines. The adapter has two standard RJ-11 jacks—one for the phone line and one for your handset—so your phone

and modem can share a single telephone line. The adapter, however, lacks any indicators that reflect connection or transmission status—a frustration when you lose a connection.

GeoPort's main advantage over most standard modems today is that it can process not only fax and data, but voice information as well. And since GeoPort is tied to the CPU, throughput should increase when you upgrade to a faster Mac. GeoPort also integrates well with PowerTalk and QuickDraw GX environments, since Telecom 2.0 software includes gateways for processing fax and voice messages from multiple users.

Mac Answering Machine

The MegaPhone software turns your Mac into a giant telephone and answering machine. Using a PlainTalk microphone as a mouthpiece and a pair of headphones as a receiver, you can use your computer to place and receive telephone calls; a quick-dial directory stores the telephone



numbers of people you call most often.

The quality of the audio, however, doesn't compare with that of a standard telephone. When I tested the telephony software, some callers commented that I sounded distant, and since you can't increase the gain on the PlainTalk microphone, I was forced to lean forward and speak louder—a source of irritation and amusement for my coworkers.

MegaPhone's voice-mail feature converts your computer into an answering machine by saving phone messages to your hard drive. You can also route calls through PowerTalk and forward voice-mail messages to other computers.

Unfortunately, the full version of MegaPhone that ships with the GeoPort Telecom Adapter Kit expires after 30 days; after that you're limited to placing and receiving calls manually. To retain

the quick-dial directory and voice-mail features, you need to send \$49.95 to Cypress Research (510/732-3830) for a full-featured version of MegaPhone.

Faxing and Data

Apple's fax software is easy to use, and it capably transmits and receives faxes. You can also use the fax software with QuickDraw GX to convert your workstation into a fax server for your LAN.

Unfortunately, the fax software's OCR capability is poor. When I faxed a clean document (using standard resolution) from a fax machine to my computer, the OCR function yielded text containing numerous misses and errors. Also, my Power Mac 7100 (with 8MB of RAM) crashed repeatedly when I attempted to use the OCR function to convert a five-page fax into a text document. I had to select smaller portions of the document and use the OCR function on one chunk of text at a time. The fax software also lacks importing ability, preventing you from easily adding an existing list of fax numbers to the fax phone book.

To test GeoPort's data transmission, I downloaded several large files from America Online and used my computer as an ARA Personal Server; both operations worked successfully. I also used GeoPort over a PPP connection with a local service provider to test Internet access and Web browsing (using Netscape Communications' Navigator); the browsing speed was comparable to that of a 14.4-Kbps modem.

At press time, Apple said that it is working on faster implementations of GeoPort. (Since GeoPort uses the high-speed serial port of Power Macs and 680X0 AV Macs, it is capable, theoretically, of 2MB-per-second transmission speed.) But if you purchase GeoPort today, it's unclear if you'll have to buy new GeoPort Telecom Adapter hardware in the future, or if a simple software upgrade will suffice.

The Last Word

The GeoPort Telecom Adapter Kit allows you to integrate fax, data, and telephone services within your computer. Though the kit's price is competitive enough with those of 14.4-Kbps fax modems to attract users who don't require superfast connection rates, it should be lower, because the kit merely unlocks technology that you've already purchased with your Power Mac or 680X0 AV Mac.—MATT CLARK

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It faithfully took you to
the mall, the drive-in and
the office. But now it's
time to part. And the sooner you can sell, the sooner you can buy. So you post an ad
with a picture file on the Internet. To make sure everyone can see how beautiful your

baby is, you scan the photo with your Agfa scanner. It captures the color perfectly and

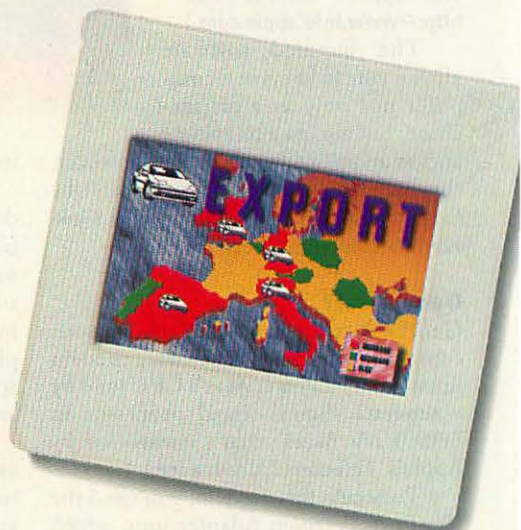
the detail impeccably. Which is why you also use it to scan in the map that's going to

make your international sales report look

like gangbusters. Who knows? It could

help you get one of those executive

parking spaces for your new baby.



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The complete picture

HP ScanJet 3c

Desktop Scanner

PROS: Economical; broad tonal range and accurate colors; DeskScan II software automates scanning; rich software bundle. **CONS:** Setting custom resolution is time-consuming. **COMPANY:** Hewlett-Packard (208/323-2551). **LIST PRICE:** \$1179; transparency adapter \$759.



THE HEWLETT-PACKARD SCANJET 3C color scanner, while retaining the \$1179 list price of the ScanJet IIcx it replaces, raises the resolution ante to 600 dpi and gains a broader dynamic range through 30-bit (rather than 24-bit) scanning, which pulls details out of inky shadows without losing picture information in brighter areas.

HP bundles Caere's WordScan OCR software, Adobe Photoshop LE (actually Photoshop 2.5), and an HP ScanJet Copy utility that converts your scanner-and-printer combination to a photocopier. The package also includes the DeskScan II double-duty stand-alone scan utility and TWAIN plug-in, for Photoshop and other TWAIN-compatible software.

Of course, because the ScanJet 3c has 600-by-600-dpi optical resolution—it can simulate up to 2250 dpi by interpolation—its files are humongous. You'll find this 8.5-by-14-inch scanner's high-res capabilities most useful for capturing finely detailed line art, such as on postage stamps, and 35mm or larger transparencies. The optional \$759 transparency adapter—basically a replacement top cover with a built-in, traveling light bar—gave our test machine a chance to flex its high-res capabilities and extended dynamic range.

While the 3c proved no faster than the IIcx (taking about 38 seconds to scan a 4-by-5-inch color test print at 200 dpi, and 2 minutes to scan a 1-by-1.5-inch 35mm slide at 600 dpi), it pulled out details of some very dark color transparencies visible only when the slide was held up to a strong light (these slides stymied other scanners). The unit was also good at handling high-contrast originals with details in the shadows and highlights. Most 24-bit scanners let you have the shadow detail, or the highlight detail, but not both.

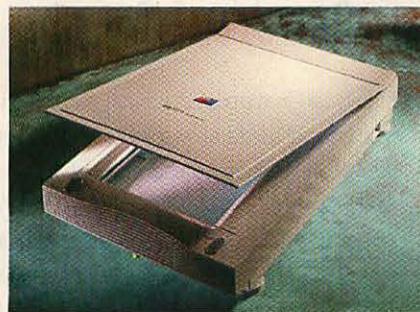
While 24-bit scanners theoretically capture 8 bits of information (256 hues) for each of the red, green, and blue color channels, some information is always lost when the image is digitized. The Scan-

Jet grabs 10 bits of information per channel (more than a billion colors), from which it builds an optimized palette of up to 16.7 million colors. Gray-scale images are scanned using 1024 tones, mapped internally to the traditional 256 levels of gray. This oversampling technique gives the ScanJet a broad dynamic range—the ability to reproduce the wider range of colors and tones.

DeskScan II helps scanning neophytes get good scans on their first try. Just click on the Preview button, and the utility scans the entire 8.5-by-14-inch platen; puts a selection marquee around the (best-guess) subject area; and decides whether you're capturing line art, a color or gray-scale photo, or a transparency. DeskScan can also automatically adjust brightness and contrast, and correct the color in your image.

Routines are included to calibrate your monitor as well as the "print path," which is actually any destination, from display screen to fax, imagesetter, or color/monochrome printer. Customizable print-path controls include color and tonal balancing parameters, as well as resolution settings for both horizontal and vertical directions.

There are no slider controls to adjust resolution, so if you want 175 dpi, you must use the Custom:Print Path dialog



RICHARD KETHEMEYER

box and type the values in manually. I learned to save frequently used resolutions as custom print paths so they'd be available from DeskScan II's convenient Path drop-down list.

The transparency adapter adds an inch and a half to the ScanJet's 4.5-inch thickness, but adds nothing to the 11-by-14.5-inch footprint. You can leave the adapter on all the time: flipping its separate power switch automatically toggles DeskScan into and out of transparency mode.

The Last Word

Equally adept at OCR scanning with WordScan or image editing with Photoshop, HP's ScanJet 3c takes 30-bit, 600-dpi capabilities to new lows in price—and new highs in ease of use.—DAVID D. BUSCH

Nightingale 2.0

Music-Notation Software

PROS: Easy to learn; very fast; powerful editing tools; includes music-scanning utility; very competitive price. **CONS:** Incomplete tutorial; manual full of typos. **COMPANY:** TAP Music Systems (206/462-1007). **LIST PRICE:** \$495.



NIGHTINGALE IS LIGHTNING FAST and includes an arsenal of tools—one for nearly every musical symbol. The program's mnemonic approach to music notation lets you get under way with only a basic knowledge of the tools (important since the tutorial is incomplete and the user manual is rife with typos).

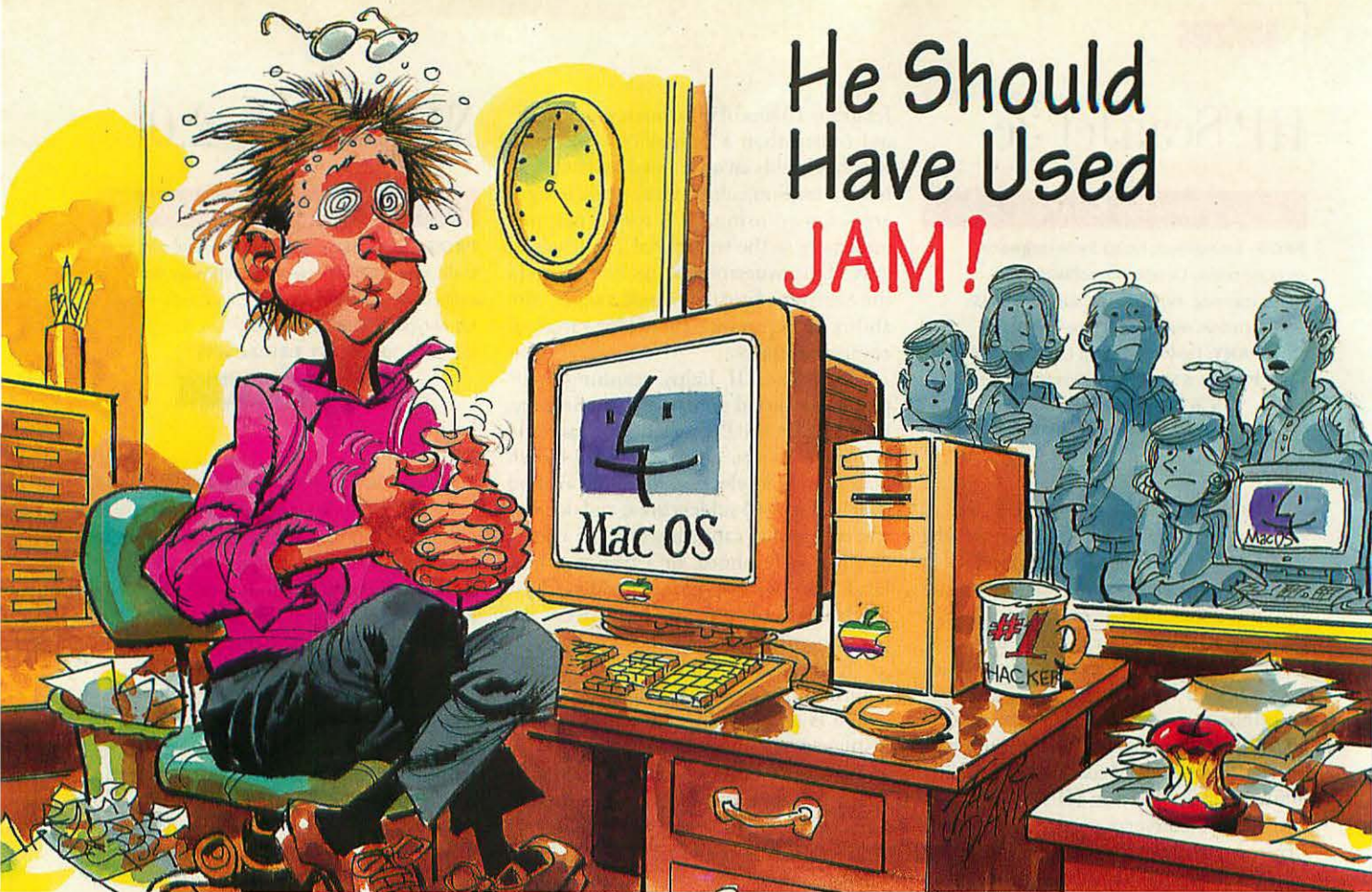
Unfortunately, Nightingale 2.0 uses Apple's MIDI Manager, but the company plans to replace this error-prone relic with its own internal MIDI driver in the next release, which is scheduled to include a native Power Mac version and should be shipping by the time you read this.

Using my Mac IIxi with 4MB of RAM and Connectix's RAM Doubler, I compared Nightingale with Coda Music's Finale. I imported the same MIDI score into each program, and extracting parts (transposed with multibar rests) took about 3 minutes in Nightingale and 20 minutes in Finale. Nightingale's screen redraw was about twice as fast, and zooming was three times as fast.

Nightingale offers all the standard options for notation input: MIDI file importation, simple mouse-click note entry, step-time entry using a MIDI instrument and the Mac keyboard, and full-fledged live-performance recording. Included is a note-entry method not offered by any other music-notation product: OCR scanning. (As always, don't use this technology on copyrighted material without permission.) While music OCR is a technology in its infancy and one should not expect perfection, NoteScan is accurate enough at getting printed music into a Nightingale file format, recognizing only notes, rests, and barlines. Once you've digitized your score, you can use Nightingale's powerful editing features to clean it up and edit it. Nightingale's Sonata TrueType font (PostScript printer font not included) imparts a beautiful printed look to scores and parts, but is less graceful than Finale's Petrucchi.

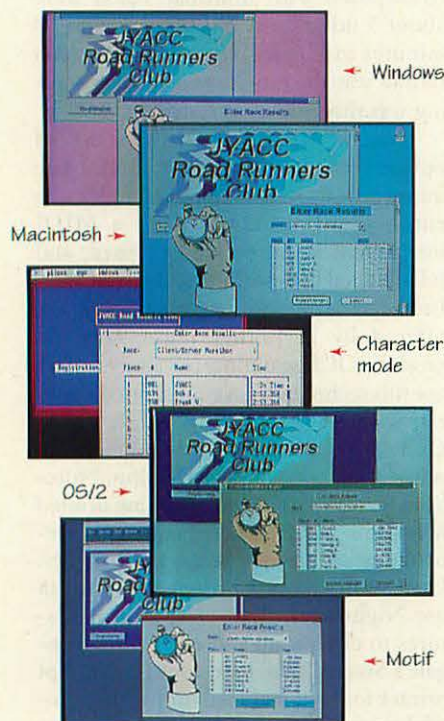
For step-time entry, Nightingale takes a mnemonic approach to setting the duration of a pitch or chord played on a

continues



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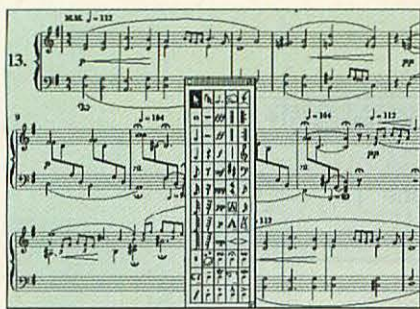
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musical keyboard or other MIDI instrument; you press the Q key on the computer keyboard to specify a quarter note, press E for eighth notes, W for whole notes, and so on. Once you've entered a note, pressing the spacebar doubles its duration. In a finished recording, you can use the mouse to stretch or shrink notes to increase or decrease their duration.

Performance recording is logical and accurate, allowing the user to set the sensitivity (quantization) of the MIDI data to compensate for human timing errors. Nightingale's performance recording lets you "punch in" during the playback of a score, rerecording over existing tracks.

Nightingale has unique editing features. The Threader tool selects a series of discontinuous notes and rests to create a musical line that can be manipulated or analyzed. You can apply nearly any editing function to a thread—changing note heads, dropping the notes an octave, switching stem direction. Similarly, the



The Arsenal Nightingale's tool palette appears too complete at first, but doesn't get in the way.

QuickChange feature allows you to make wholesale changes to particular categories of symbols. For instance, to put an accent (velocity=120 in MIDI-speak) on each note in a selected section of your score, you navigate the QuickChange dialog box to select notes/rests as the category, velocity as the action, and 120 as the value.

Nightingale highlights any measures with too many or too few beats—so no more embarrassing 4/4 bars with an extra beat. The program also lets you select a section of music for localized playback—useful when you need to hear only part of a score. One of Nightingale's most useful features is arguably its simplest—mouse shaking. A flick of the wrist switches any tool to the solid selection arrow.

The Last Word

Nightingale is a complete compositional and music-notation program. Fast, easy to use, feature laden, and moderately priced, it can go round for round with any music-notation product on the market, and it throws in musical OCR scanning as well—what a bargain.—RICHARD FENNO

Managing Your Money 7.0

Personal Financial Software

PROS: Detailed investment features; improved data entry features; useful financial advice on CD-ROM version. **CONS:** CD-ROM articles are poorly organized. **COMPANY:** MECA Software (203/255-1441). **LIST PRICE:** Floppy disk version \$79.95; CD-ROM version \$99.95.



MANAGING YOUR MONEY 7.0 (MYM) features a new interface to make computerized financial management more accessible than in previous versions of the program. Though MYM still offers the old flowchartlike Navigator interface found in version 6.0 (see *Reviews*, June 1994), the default interface now uses the metaphor of a home office. You access MYM's various financial functions by clicking on the appropriate objects in the study; clicking on the open checkbook atop the SmartDesk accesses your check register, while SmartDesk drawers access your accounts, budgets, tax information, and so on.

Some new MYM features are integrated tightly with CompuServe. For instance, the new ChargeLink feature, when combined with a CompuServe Visa card, allows you to download your credit card balance and transaction data from CompuServe into your MYM file. Another CompuServe-affiliated feature, QuoteLink, releases you from tediously entering loads of investment data by allowing you to download securities prices into your file (though you have to call a 900 number at \$1 per minute if you're not a CompuServe member).

MYM's excellent investment features still eclipse the competition's. For instance, MYM can track and store high, low, volume, and closing prices for securities, whereas Quicken tracks only current quotes or closing prices. MECA has also added a historical price graph to help you



The Money Room The SmartDesk is the entree to Managing Your Money, with each object leading to a different feature. Clicking on the scales, for example, brings up the Reconciliation window.

visually track the life of your investments.

MYM produces useful projections for mortgage payments, college and retirement planning, and insurance purchases, as well as reports and graphs for summarizing and visualizing your financial data. MYM's interaction with CheckFree, the national electronic bill-paying service, has been improved, since you can exchange E-mail inquiries with CheckFree and schedule recurring payments for variable, rather than fixed, amounts. MYM 7.0 also provides extensive built-in help.

Though the core interface of MYM remains a bit more difficult to use than Intuit's Quicken (MYM requires you to use the mouse more often to switch between accounts, and MYM's on-screen forms aren't as easy to read as Quicken's), MYM 7.0 has improved data entry features. For instance, a SmartFill feature streamlines check writing: as you type in payee information, MYM searches your list for matches, automatically filling in data such as name, address, and amount. (The SmartFill feature, however, doesn't equal Quicken's automatic fill feature.)

The CD-ROM version of MYM 7.0 contains advice from financial author Andrew Tobias. His low-key, sometimes humorous advice is divided into eight categories: Computerizing Finances, Mortgages and Debt, Saving, How to Invest, Where to Invest, Retirement, Taxes, and Insurance. Each category is subdivided into several topics; for instance, the Mortgages and Debt category offers advice concerning Pre-paying Your Mortgage, Mortgage Twists, Credit Cards, Car Loans, and Loans to Friends.

The CD-ROM also contains 153 financial articles (from Information Access Company's Personal Finance Database Plus) covering a wide range of subjects, from selecting the right mortgage to "Ask Dr. Tightwad." The articles provide useful information, but are poorly organized; all the titles are presented in a long scrolling list, and there's no index or search mechanism.

The Last Word

Managing Your Money 7.0 can handle complicated financial situations easily, and its advanced investment features make it the best choice for sophisticated investors. Though the program still isn't as easy to use as Quicken, MYM's new interface, coupled with the useful financial advice available on the CD-ROM, make the CD-ROM version a good choice for people new to computerized money management.—TOM NEGRINO

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PhotoFusion 2.0.3

Photoshop Compositing Plug-In

PROS: Handles fine detail and full-range opacity using sophisticated color-differencing algorithms. **CONS:** Interface is neither interactive nor intuitive; no zoom controls; operates in a modal window; poor documentation. **COMPANY:** Ultimatte (818/993-8007). **LIST PRICE:** \$695.



PHOTOFUSION 2.0 EXISTS for one reason only: to allow Adobe Photoshop users to composite a still image shot in front of a blue or green background screen into a different background scene. PhotoFusion 2.0 was designed to make elegant compositing straightforward and to offer more-powerful image control to advanced users. But while it is reasonably powerful, it's poorly designed.

The difference between a subtle, beautiful mask (or matte) and a crude one is akin to the difference between jagged and antialiased type; the edges of a good mask contain many gradations from opaque to transparent, even allowing for such subtleties as wisps of hair and shadows. Ugly masks, like type before the dawn of scalable fonts, are essentially binary. They are made up of completely transparent or completely opaque pixels, and they have a hard, crude look.

If you've been careful about your shot, making sure the background was clean and well lit, PhotoFusion enables you to composite shadows and reflections and even semiopaque items, such as a glass of water. But in the real world of grimy stage sets and uneven lighting, using PhotoFusion is a lot tougher.

PhotoFusion 2.0 shows the signs of a program developed for another platform and then ported to the Macintosh with little adaptation. The controls are for film and video production and will seem counterintuitive to anyone accustomed to the laws of 24-bit RGB color. For example, level controls are expressed as a percentage, with 80 as the default, and lowering the black values actually raises the black level. Color-correction controls are based on a set of standards that Ultimatte established long before there was such a thing as computer graphics.

The program runs in a modal window under the Acquire command in Photoshop, which means that when the window is open you can't get to the desktop without canceling back to Photoshop.

In an ideal scenario, you import your foreground and background images, set the background color, and the software composites your images. You make little or no adjustment to the factory preset controls. However, if you need to make a series of changes, the preview window isn't live; you must make your best guess at adjustments, then press the preview button.

Once you have done this, you get your one and only chance to undo. If you want to zoom in and look at the composite up close, you must exit to Photoshop. You cannot reposition the foreground element, and you cannot composite multiple layers on one pass. For all of these reasons, Adobe After Effects with its Keying Effects Pack, even at three times the price, is a far better choice for Macintosh users who need compositing.

Incredibly, the version I used (2.0.3) accepts only documents saved in Photoshop 2.0 format, but a call to technical



The Subtle Art of Compositing Unlike cruder binary keyers, which operate like Photoshop's magic wand tool and allow a pixel only to be fully opaque or fully transparent, PhotoFusion produces a mask with 256 levels of opacity, for subtle and realistic-looking composites from a blue or green screen.

support (whose number is not included in the manual) revealed that there is a 2.0.4 update that imports Photoshop 3.0 images as well; PhotoFusion recognizes no other file formats. On the bright side, performance on a Power Mac 8100/100 is extremely fast.

The Last Word

The last sentence of the 25-page manual (which has no index and makes no mention of the more technically descriptive online help) effectively sums up the software's shortcomings: "In general, you will realize your best results if you use PhotoFusion near or at its default settings and use Photoshop to refine the critical Mask image." Indeed, PhotoFusion does a nice job on perfectly shot footage, but in my experience, most footage needs a lot of tweaking. Unfortunately, PhotoFusion's design makes tweaking very frustrating.

—MARK CHRISTIANSEN

TurboTalk 1.0

Network File-Transfer Utility

PROS: Speeds up file transfers when used with some network configurations; simple, transparent operation. **CONS:** Unimpressive performance on 68030 Macs and on LocalTalk networks; buggy; weak documentation. **COMPANY:** Information Presentation Technologies (805/541-3000). **LIST PRICE:** Peer-to-peer two-user license \$190; TurboTalk for AppleShare server \$395; TurboTalk for uShare Unix server \$495; TurboTalk Client two-user license \$160.



IF YOU'RE RUNNING A MAC NETWORK, TurboTalk's appeal is obvious. Here's a product that promises to turbocharge any network—speeding up file transfers, reducing the time it takes to open and save files, and making network applications launch faster. But TurboTalk isn't for everyone. The acceleration varies dramatically according to the network you're running and the Macs attached to it. In some cases, TurboTalk's speed improvements are minimal.

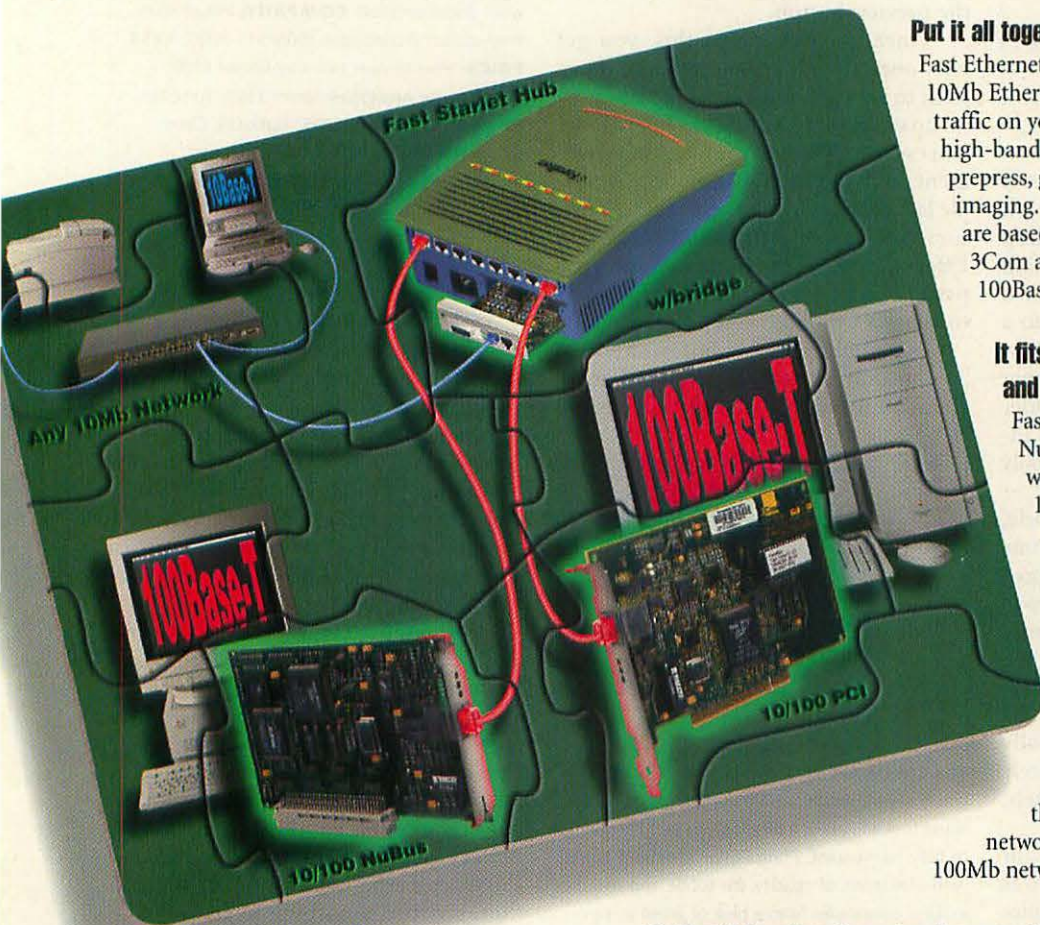
TurboTalk consists of two extensions and a control panel. Using TurboTalk is a breeze, but installing it is laborious. With a 2-user or 5-user package, you must type in a 37-character key code for each installation. You can install 10-, 20-, and 50-user versions without typing in the codes, but the documentation doesn't include instructions.

Once TurboTalk is installed, though, there's virtually nothing to set up. The software automatically detects whether any other Macs on the network are running TurboTalk, and it employs its protocols only when communicating with



Set It and Forget It The TurboTalk Setup control panel lets you turn TurboTalk's extensions on and off during a work session. The Options buttons provide access to features that customize TurboTalk for unusually large network configurations.

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other TurboTalk-equipped Macs.

TurboTalk improves network performance in two ways. First, when you copy a file TurboTalk handles the reading and writing of data. On this level, the program works much like Symantec's CopyDoubler or Aladdin's SpeedBoost. (The file-copying enhancements also work in conjunction with other applications, modestly improving the speed of open and save functions over a network.)

TurboTalk is also supposed to improve the AppleTalk networking protocol to allow more efficient use of available bandwidth. In reality, these protocol enhancements don't amount to much. When I disabled TurboTalk's file-copying features and used only the protocol enhancements, I saw virtually no improvement in network file transfers. A call to technical support confirmed that the enhancements are relatively minor.

TurboTalk works over all types of networks, including LocalTalk, Ethernet, FDDI, and 10BaseT. Not every configuration yields optimal performance, however. For example, when using the peer-to-peer version for sharing files over Ethernet, my file-copying speed improved by about 30 percent. While that's noteworthy, it's not the 200 to 500 percent improvement promised by IPT.

How much TurboTalk improves your network performance depends on the specific configuration of your hardware. For example, you see larger speed gains on Power Macs than on 680X0 Macs. Using TurboTalk along with CopyDoubler on a LocalTalk network won't provide any speed gain over using CopyDoubler by itself. Ironically, users of slower LocalTalk networks—who are the most likely to want to speed up data transfers—will benefit the least from TurboTalk's enhancements.

Finally, it appears that some of TurboTalk's kinks are being worked out. The version I tested (1.0) was not compatible with DiskDoubler. I experienced several lockups before learning from tech support of an acknowledged bug that causes problems on LocalTalk networks. (The glitch has been fixed in 1.0.1.)

The Last Word

TurboTalk will probably speed up your network file operations to some degree—but with many configurations the improvements simply aren't worth it. Forget TurboTalk if your network consists of a series of 68030-based Macs linked via LocalTalk. And even with faster equipment and Ethernet, TurboTalk doesn't work any magic—it speeds up only functions that involve file transfers.

—JOSEPH SCHORR

Newton Spreadsheets

Business Tools

Equate 1.0

PROS: Convenient Excel compatibility; special spreadsheet-oriented keyboard. **CONS:** Slow load, save, and recalc. **COMPANY:** Holosoft (408/748-9648). **LIST PRICE:** \$99.



QuickFigure Pro 2.1

PROS: Fast; includes charting and linear equation solving. **CONS:** File import requires workarounds. **COMPANY:** PelicanWare (503/221-1148). **LIST PRICE:** \$49.95.



THE QUESTION ABOUT THE NEWTON MessagePad, two years after its introduction, is still, what exactly do you do with it? Is it mainly a mobile platform that allows you to take bits of desktop applications on the road? Or is it a real, albeit tiny, computer in its own right? Equate and QuickFigure Pro face off squarely in this debate.

Equate

Holosoft takes the view that you are likely to develop spreadsheets in Microsoft Excel and use your Newton as a way to print or fax invoices, expense reports, and such, in the field. Although Equate's spreadsheet keyboard is handy, you'd have to be very patient to want to set up business worksheets in Equate itself.

Holosoft has made the flawless import of Excel files Equate's main virtue. If, for example, you have a standard set of Excel files, you can download these to your Newton in a batch operation, and then, when you're on the road, tinker with the numbers using the numeric keypad. The version I tested requires worksheets saved in Excel 4 format. Within that format, though, Equate preserves all aspects of formatting on import, including column widths, type styles, and worksheet names. Through clever memory management, it can handle very large sheets. Holosoft claims Equate can import a 16,384-by-255 (columns by rows) sheet—I imported a 2000-by-100 sheet (gigantic by Newton

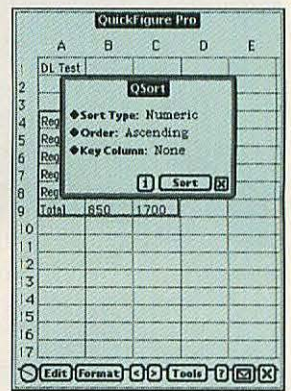
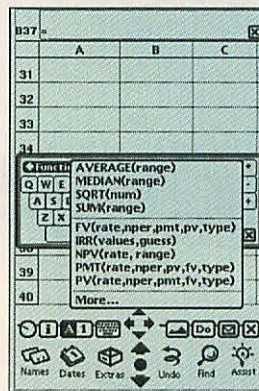
standards) and opened it with no problems. For viewing such big worksheets, Equate provides a handy viewing window you can drag to any zone.

Equate's main drawback is that it's big for a Newton program (almost 300K) and thus relatively slow at both file handling and recalculation. There are settings for adjusting memory use for faster recalc, but with the preferences set to "full speed ahead" it still just dawdles.

QuickFigure Pro

QuickFigure Pro, in contrast, is designed for quickly developing spreadsheets on the Newton itself. It can import Excel files saved as tabbed text with formulas showing, but it doesn't preserve column-width information or absolute references correctly. Worksheet names are also lost.

It's not as qualified as Equate to act as a portable Excel file server, but QuickFigure is definitely the software to have if you're figuring out a little financial puzzle at 27,000 feet. It's fast, it's delightful to use, and it has a respectable set of functions (including lookup tables), as well as a utility for solving linear equations and a simple charting function. QuickFigure



Cell Mates Equate (left) and QuickFigure Pro look similar, but they serve remarkably different purposes.

spreadsheets are small by desktop standards (50 rows by 26 columns), but realistically this is about as large a spreadsheet as you'll want to tap in with your little Newton pen. (A simpler version called QuickFigure Lite is available for download from America Online and eWorld.)

The Last Word

Equate is the best Newton companion for Excel, and QuickFigure is the best Newton stand-alone spreadsheet. These products deal with the limitations of the Newton in almost opposite ways, but they both do good jobs in their respective domains.

—CHARLES SEITER

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PowerCADD 2.0

CAD Program

PROS: Exceptional speed; extensive collection of drafting tools. **CONS:** Many floating palettes make a large monitor advisable.

COMPANY: Engineered Software (910/299-4843). **LIST PRICE:** \$795.



POWERCADD IS THE POWER Mac version of PowerDraw, one of the oldest, and traditionally one of the best, 2-D drafting packages

for the Mac. Currently, Engineered Software is shipping PowerDraw 6.0 for 680X0 Macs and PowerCADD 2.0 as separate products (same price) with essentially identical feature sets.

Naturally, PowerCADD's greatest benefit is speed, but Engineered Software has added many new features to the mix since we last looked at PowerDraw.

Fast CAD

PowerDraw was always fast, but it didn't have the hardware resources that PowerCADD has at its disposal. The performance increase, resulting from the combination of efficient software and agile hardware, is dramatic—speed experienced only with workstation-class machines. On a Power Mac 7100/80, drawing response is virtually instantaneous, and screen redraws are almost as fast, even with fairly complex drawings. PowerCADD does the best job of harnessing the Power Mac's capabilities I've seen.

PowerCADD also incorporates interface enhancements that make drafting tasks less cumbersome. The Window Manager, for example, is a floating pop-up menu that automatically stacks or tiles multiple drawing windows. Additionally, it lets you save window arrangements, along with currently active tool attributes, so you can recall specific configurations for particular projects.

PowerCADD also includes a floating Status palette that provides handy buttons for zooming and that displays the current level of magnification—a big improvement over the old \mathbb{H} -key-driven zoom function. And Status lets you change the working scale of the drawing and adjust the distance by which the arrow keys nudge objects, all on the fly.

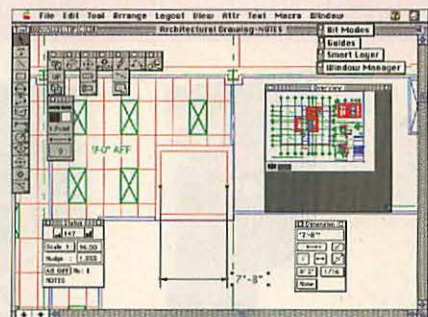
Another palette makes controls for adding and editing dimensions more accessible. The Dimension palette allows

you to alter the position of dimensional text, leader lines, and arrowheads to improve the visibility of drawing details or the legibility of a dimension. Plus this palette lets you change the units of measurement governing the dimension, the degree of accuracy for the measurement, and even the range of tolerance, all without grappling with dialog boxes—nice.

Lastly, the Overview window displays a miniature of the document, facilitating navigation around large drawings. As you zoom in on details or pan over the drawing, the Overview window shows the big picture. Overview is an interactive window, so when necessary you can relocate objects inside it. Move the cursor to Overview and press the option key, and a rectangle appears, denoting the section of the drawing currently displayed in the document window. Best of all, when you select something in Overview, the document window automatically zooms (when you hold down the option key) or pans (with option- \mathbb{H}) to that location. Overview is a wonderful navigation tool.

External Power

These palettes, windows, and menus are all externals—modules similar to the plug-in tools of graphics programs. PowerCADD relies on externals for everything from additional drawing tools to file-translation functions to plotter drivers. Drawing-tool externals are accessed



Powerful Palettes PowerCADD's floating palettes facilitate drafting chores by placing such operations as dimensioning right at hand.

via pop-up menus on the main tool palette or as individual floating icons; you access other functions as menu commands.

New externals include a Select Special command that lets you make global selections according to the type of object and its attributes, such as color, fill pattern, and so on. Another, the Export Data command, produces a file with information on object attributes and coordinates, which you can in turn import into a

spreadsheet to serve as the basis for recording a bill of materials. The Objects on Path command automatically distributes objects along user-defined paths.

PowerCADD's external architecture and its built-in macro language give the program exceptional versatility. Of course, building macros is programming, so it's not for everyone. However, PowerCADD comes with a large assortment of useful macros. Additional collections of external tools, macros, and file translators are available separately (at various prices) from Engineered Software and third-party developers. Also available are collections of symbols, both general and profession-specific, for use with PowerCADD's competent library function.

PowerCADD is chock-full of useful drafting tools. For example, the program can build parametric symbols with editable associative dimensioning. And it offers Sheets, a great layer-management tool similar to the styles of word processors, which lets you change from one layer configuration to another with a single command. The program also has an Edit Group command that allows you to edit individual objects within a group without disturbing the group's relationship. PowerCADD's features list goes on and on. It defies enumeration.

Modest Requirements

Of course, PowerCADD demands a Power Mac, but otherwise its needs are modest. The program requires only 4MB of available RAM. You can actually do real work in such a minimal partition, but naturally more memory is recommended.

PowerCADD comes with so many external tools that when all the palettes, drawing-tool icons, and pop-up menus are deployed, screen clutter becomes an issue. Yes, all floaters can be toggled off and needless tools removed from the program's Externals folder. Still, to get full functionality from PowerCADD's many floaters, a large monitor is advisable.

Essentially a tool and feature reference, PowerCADD's manual seems quaint by today's glitzier standards. But it's straightforward and to the point. Everything you need is there, including documentation of the program's Pascal-based macro language.

The Last Word

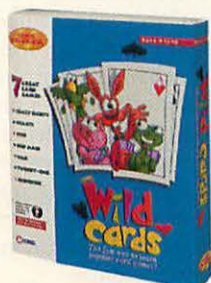
PowerCADD is suitable for general 2-D drafting tasks and customizable for the demands of professions such as architecture and mechanical engineering. Continual improvement and a middle-of-the-road price make it an excellent value. But best of all, PowerCADD is outstandingly fast.—CARLOS DOMINGO MARTINEZ



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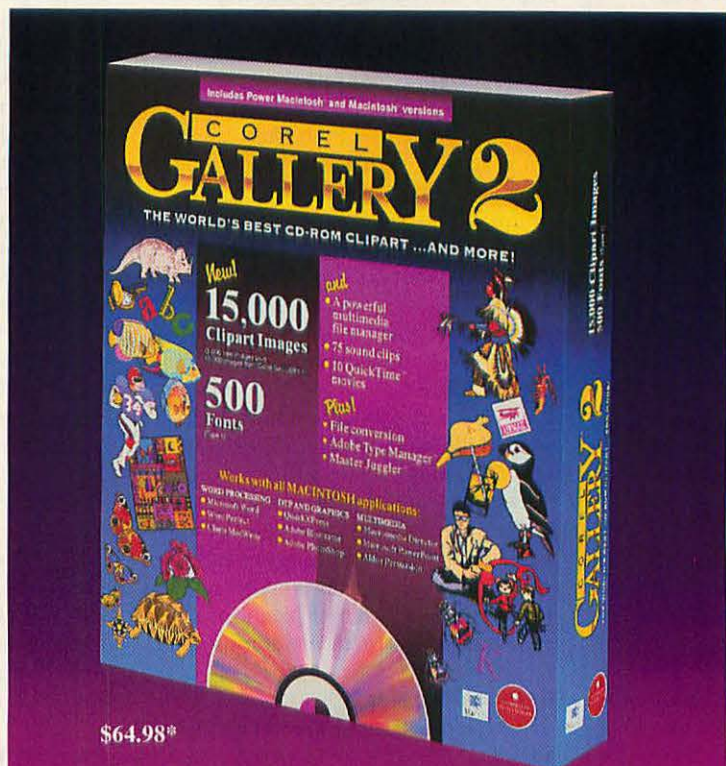
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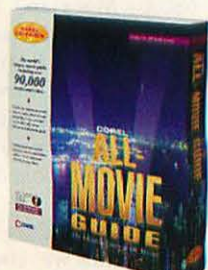


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Point Pad

Pointing Device

PROS: Compact; can be used with a stylus or fingernail. **CONS:** Not suitable for left-handed users; awkward for dragging; no way to fine-tune cursor response. **COMPANY:** Hagiwara Sys-Com (619/546-9989). **LIST PRICE:** \$99.



THE POINT PAD IS A COMPACT touchpad similar to MicroQue's Que-Point and Alps Electric's GlidePoint (see *Reviews*, *Macworld*, May and July 1995). Unlike those products, which sense the interaction between your skin and a weak electrical field, the Point Pad responds to pressure. It even comes with a plastic stylus; pens and other sharp instruments are verboten, however, since they might damage the pad's coating. The Point Pad carries a one-year limited warranty.

The Point Pad connects to the Mac's ADB port with a 3-foot cable. (Unfortunately, there is no pass-through connector to let you keep your mouse or trackball hooked up as a backup.) The pad's two buttons are located on the left side, an arrangement that makes the Point Pad a poor

choice for southpaws. You can't reorient it. The larger button, on the bottom, functions like a standard mouse button, while the smaller one, on top, locks for dragging. Both buttons provide adequate auditory and tactile feedback when pressed, and the lower button has a ridge that lets you distinguish it by touch.

The Point Pad also lets you click by tapping lightly on the pad, and you drag the cursor by sliding your finger along the pad's surface. Although Hagiwara touts the Point Pad's pressure sensitivity as an advantage, I found it frustrating, even after a few weeks' practice. While dragging the cursor down long menus, I sometimes launched programs unintentionally when I relaxed my



finger ever so slightly. (I even made the wrong selection in a few dialog boxes this way.) Eventually, I overcompensated, pressing harder, which made my finger ache.

The pad's small size presented another problem, since my finger sometimes hit the edge of the active area before the cursor reached its destination on the monitor. (This is a problem with other compact touchpads, too.) I would have liked to fine-tune the pad's cursor response with control panel software; alas, Hagiwara doesn't provide any, relying instead on Apple's standard mouse driver.

The Last Word Overall, I was happiest using the Point Pad's supplied stylus, but that meant hunting and reaching for it every time I wanted to move the cursor. If you're going to go through the trouble of using a stylus, and you can afford to pay the extra cost, you may as well invest in a more capable drawing tablet such as Wacom's Art-Pad (see *Reviews*, April 1995). For users who are really short on space and have their hearts set on a touchpad, though, I would recommend the Glide-Point over the Point Pad: the GlidePoint is easier to use, and it works facing in any direction.—FRANKLIN TESSLER

File Genie Pro 1.1

Disk- and File-Management Utility

PROS: Fast, convenient cataloging and searching of offline storage; small RAM and disk space requirements. **CONS:** Limited search and sort criteria; no disk labeling; requires System 7. **COMPANY:** Duet Development (408/559-3838). **LIST PRICE:** \$89.



THE STORAGE NEEDS OF TODAY'S Macintosh users routinely exceed the limited capacity and mobility of even the largest hard disks. There's no shortage of alternative storage solutions, but how do you keep track of files scattered across SyQuest, Bernoulli, and magneto-optical cartridges; floppy disks; and CD-ROMs? Enter File Genie Pro.

File Genie Pro is an application-and-extension combination. Whenever you eject a disk, the File Genie Pro Extension builds a catalog file of that disk's directory. The File Genie Pro application can then search the catalog as if it were a mounted volume. If you choose to access a file found in an offline volume's catalog, you get a standard "Please insert the disk: *volume name*" alert.

Catalog building is fast and transparent. In the Preferences dialog box, you have three options—Never, Always, and Ask First—for cartridges, CD-ROMs, and floppy disks. Unless you choose Ask First, File Genie Pro automatically catalogs up to 1000 volumes. Just be sure you have room on your hard disk for all the catalogs, which can range in size from three to several hundred kilobytes each.

There are compelling reasons to configure File Genie Pro to replace Find File in the Finder's File menu. File Genie Pro not only provides offline searching, it also makes searches and sorts faster. File Genie Pro allows you to search any combination of listed local, shared, CD-ROM, and cataloged volumes, individually or by type.

File Genie Pro searches for invisible files. It can sort found files by location and by the standard Find File criteria, view any data file as text, move files to the Trash, find the original of an alias, and find any document's creator application. File Genie Pro also displays the icon, kind, creation date, label, and version of any selected item.

You shouldn't throw Find File away yet, though. Along with its advanced features, File Genie Pro comes with some disappointing limitations. Worst is the skimpy set of search criteria. For each search, you can choose only one of six basic criteria. That's just a fraction of what Find File

offers. You can't change the list font from 10-point Geneva, and though items appear in the color of their label, you can't sort or search by label.

File Genie Pro has another surprising deficiency. It can't print disk names and contents to labels; it can't even export names to text files.

The Last Word For a “pro” disk-management utility, File Genie Pro is a bit short on pro features. However, its transparency and speed make it worth considering if you don’t need disk-labeling and advanced search functions.—PETER M STOLLER



File Genie Pro's Search A shortage of search criteria hobbles the program.

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Adobe TextureMaker 1.0

Texture Generator

PROS: Wide range of customization options for composite images; PICT images can be imported and added to textures. **CONS:** Manual could use some tutorials. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** \$199.



TAKE ABOUT 100 BACKGROUND TEXTURES, some lighting controls, a few painting effects, some Photoshop filters, and a handful of QuickTime-movie special effects; add them together; and you've got Adobe TextureMaker. This versatile program lets you add layer upon layer of effects to a basic texture to create custom artwork.

Let's say, for example, that you want to create a 3-D Start button. You could begin with a rectangle with beveled edges, apply a marble pattern (or perhaps fish scales or zebra skin), import a PICT image of the word *Start*, emboss the letters, and adjust the lighting controls to enhance the 3-D effect. Each of these elements is in a separate layer, and each element has its own set of customization options.

The program's gallery of textures in-

cludes marble, granite, metals, liquids, animal skins, wood, gemstones, fabrics, and other patterns. You can also import your own PICT image into a layer and incorporate it into a custom texture. TextureMaker offers several filters, including lighten, darken, blur, brushstrokes, and watercolor; you can add other Photoshop-compatible plug-in filters as well. Once you've combined a number of layers, you preview the results, then render the image as a TIFF file for printed output or a PICT image for on-screen display. You can even save a texture as a short QuickTime movie, using one of TextureMaker's animated effects.

I was impressed with TextureMaker's range of graphics effects. The program lets you make a simple two- or three-layer background, or stack up to ten layers for more complex effects. In one of my experiments, I imported a PICT file, applied a sepia-tone overlay and a watercolor effect, then rendered the image as a QuickTime movie with a spotlight sweeping back and forth across the image.

In general, TextureMaker's effects are easy to apply and customize, although I would have appreciated more detail, and perhaps some tutorials, in the documentation. Although you could apply many of



Effective Textures Adobe TextureMaker lets you apply effects such as filters, embossing, and lighting to make run-of-the-mill textures into custom creations.

TextureMaker's effects using Adobe Photoshop, Photoshop doesn't offer the gallery of initial textures and the automated approach of TextureMaker—and Photoshop costs too much to use simply for creating custom textures. Of course, with a suggested retail price of \$199, TextureMaker isn't incredibly cheap itself.

The Last Word If you're tired of seeing the same old digitized-marble backgrounds, Adobe TextureMaker gives you the tools to do something about it. For those who want to create attractive, original backgrounds for multimedia presentations or printed materials, this program offers a wealth of options.—ERFERT FENTON

Power Class 28.8 Data/Fax Modem

Fax Modem

PROS: Easy to set up; excellent high-speed connections. **CONS:** Mediocre fax/telecommunications software; doesn't support V.Fast connections. **COMPANY:** Motorola (205/430-8000). **LIST PRICE:** \$395.



THERE'S A DIZZYING ARRAY OF FAX modems for the Mac using the new V.34 standard, all trumpeting 28.8-Kbps connection speeds (for more on V.34 modems, see "Blazing Modems," *Macworld*, May 1995). But 28.8 Kbps is the maximum transmission rate; most modems rarely achieve sustained throughput at this rate (owing largely to the quality of analog telephone lines). Motorola enters the crowded field of high-speed fax modems by offering superior connection capability with its new V.34 fax modem, the Power 28.8. When I tested the SupraFaxModem 288 and Global Village TelePort Platinum (see *Reviews*, August 1994 and 1995, respectively) both yielded connection speeds between 21.6 Kbps and 24 Kbps, but the Power 28.8 consistently provided connection speeds be-

tween 26.4 Kbps and 28.8 Kbps and suffered fewer disconnections.

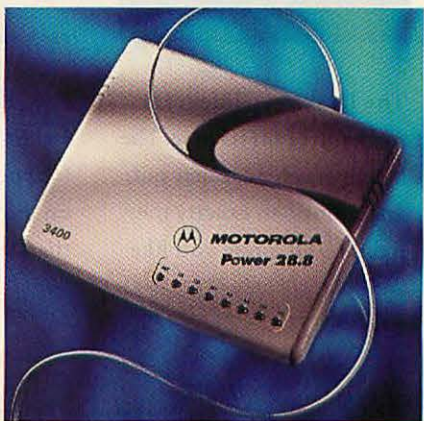
The Power 28.8 has flash memory, so you can upgrade the modem code with a simple software program to fix bugs and enhance performance. The modem also provides caller ID and a distinctive-ring feature that distinguishes an incoming call as voice, data, or fax. (If you're willing to give up the flash ROM and distinctive-ring features, you can opt for the Motorola LifeStyle Series 28.8 modem, which uses the same basic circuit design as the Power 28.8 but lists for \$86 less.)

Understandably, Motorola uses its own chip set to drive the Power 28.8 rather than the Rockwell chip set supported by a number of other manufacturers; consequently, the Power 28.8 doesn't support the V.Fast connection standard. (Before the V.34 standard was final, Rockwell developed the V.Fast scheme based on an early draft of V.34.) If you have a V.34 modem with a Rockwell chip set, you can connect to a V.Fast modem at the maximum possible speed (up to 28.8 Kbps). However, with the Power 28.8 I could only achieve 14.4-Kbps connections with V.Fast modems.

The Power 28.8 is packaged with Smith Micro's unimpressive and sluggish fax and

telecommunications program MacCom Center 1.1. The software capably handles routine connection and faxing tasks, but the program doesn't let you create scripts automatically, as you can in Software Ventures' MicroPhone II and MicroPhone Pro or Friesoft's White Knight, nor does it support gray-scale faxes.

The Last Word The Motorola Power 28.8 modem is a first-class product hampered by mediocre fax and telecommunications software. The Power 28.8 is significantly more expensive than the TelePort Platinum (\$279) or the SupraFaxModem 288 (\$249.95), but it does offer superior connection quality.—GENE STEINBERG



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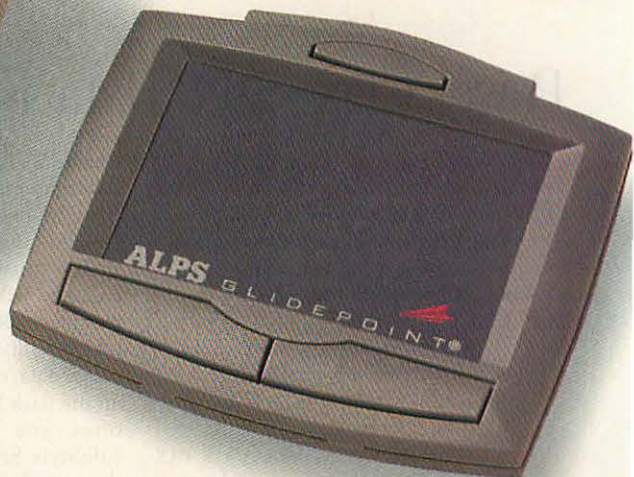
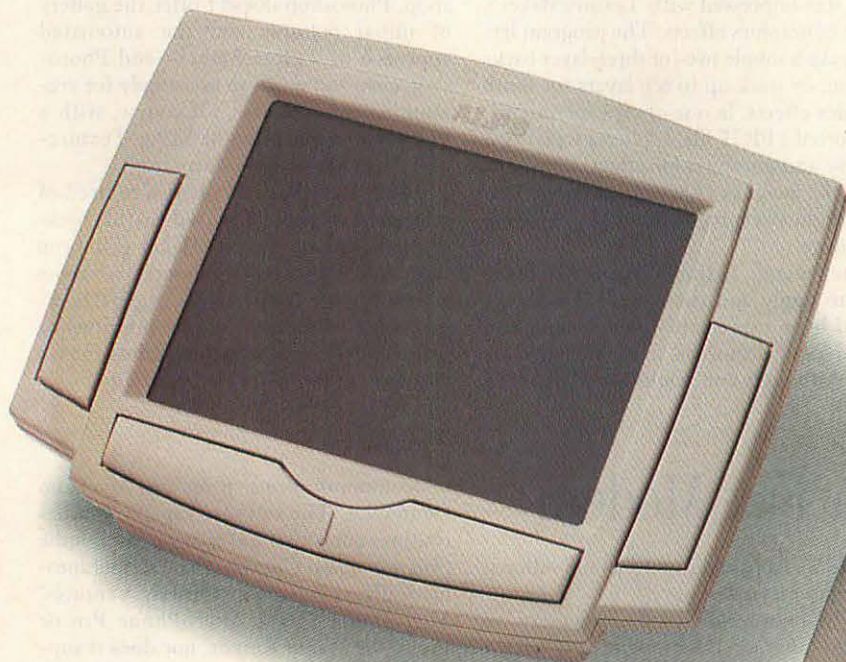
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PhoneDisc 95 PowerFinder

CD-ROM Telephone Directory

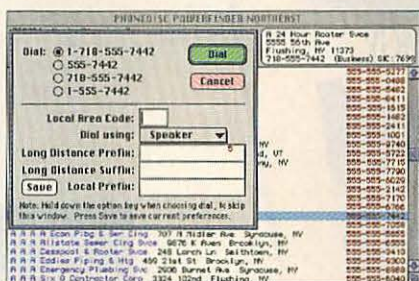
PROS: Fast; multiple search criteria. **CONS:** Information isn't always current; interface nonstandard in some places. **COMPANY:** Digital Directory Assistance (617/639-2900). **LIST PRICE:** \$249.



PHONEDISC 95 POWERFINDER IS A CD-ROM database of business and residential telephone listings in the United States. (Business-only and residential-only databases are also available as separate PhoneDisc packages.) Most of PhoneDisc's functions are so straightforward that you can get by without reading the printed manual or consulting the online help. The license agreement warns that users must not exploit PhoneDisc data commercially; however, according to the vendor, this agreement only prevents you from selling the database to someone else.

PhoneDisc's window is divided into two parts: a small section at the top features buttons that let you select your search criteria (last name, address, phone number, business type) and access PhoneDisc's other

functions (printing, dialing, exporting, counting records); the lower section presents a scrolling window displaying the search results (see "Looking It Up"). Searching by name is the most fun; as you enter characters into a text box, PhoneDisc instantly scrolls the directory listing to the name that matches what you've typed so far. (If no name matches precisely, PhoneDisc displays the closest entries in the current database.) PhoneDisc also includes cross-references for common similar names, like *Segal* and *Seigel*. When it finds a name with more than one spelling, PhoneDisc automatically displays a list showing all the alternatives. If you know a specific address but



Looking It Up PhoneDisc lets you dial, print, or export listings in its database.

don't know the name, you can scan for a city, street name, number, or apartment.

PhoneDisc's business index is based on a system called the Standard Industrial Classification (SIC), which uses numerical codes and text descriptions to specify business types. When you search by business, PhoneDisc displays a scrolling list of SIC categories for you to choose from (such as Video Tape Rental or Lawn and Garden Services). Unfortunately, you can only search for one category at a time, and the SIC listings might not include the precise type of business you're interested in.

PhoneDisc's Limit function lets you refine searches by entering additional lookup criteria into a dialog box, but the interface suffers from a few annoying quirks. For example, a field at the bottom that looks like it should accept text actually displays the name of the currently selected entry in the directory listing. Also, pressing shift-tab doesn't jump you to the previous field as in most programs.

The Last Word PhoneDisc's listings are only as current as the phone directories from which they're compiled. Yearly subscriptions with quarterly updates are available, and the basic cost includes one free update. Despite a few limitations, searching with PhoneDisc is more convenient than slogging through printed phone books.—FRANKLIN TESSLER

Storyboard Artist 1.5

Storyboard Software

PROS: Libraries of images speed storyboard creation; can create custom libraries by importing PICT files. **CONS:** Only imports graphics files in PICT format; can't draw links between frames in Link Overview mode; expensive. **COMPANY:** PowerProduction Software (310/937-4411). **LIST PRICE:** \$499.



STORYBOARD ARTIST 1.5 IS A USEFUL tool for visualizing ideas for a production, whether for yourself or to convey them to a team of colleagues. Storyboard creation is made fast and easy with library palettes of stock characters, props, and backgrounds you can layer in your storyboard's individual frames. You can also create custom libraries by importing PICT files; this means you can take pictures of your actors and locations, or draw your own characters and props, and have easy access to them in StoryBoard. (However, importing large files will require you to increase the program's RAM allocation from the minimum 4MB.)

Storyboard's interface is composed primarily of the Frame window, where you

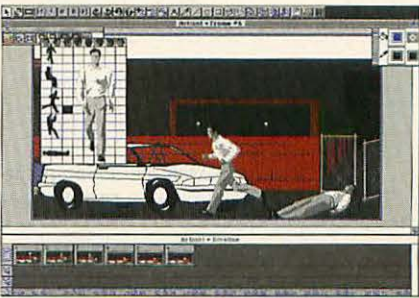
build a scene by selecting backgrounds, characters, and props from the floating library palettes. For instance, a character pull-down menu presents a grid from which you choose the direction a character faces (face view, various degrees of profile, back view) and its body posture (standing, walking, sitting) by selecting one of the grid's cells. Once you've placed an object in the Frame window, you can drag it into position, resize it by dragging the image's handles, and rotate it. A tool bar along the top of the screen displays standard navigational and frame-editing tools. For instance, the cropping tool cuts any part of an object so you can fit overlapping props or characters into one shot, and the camera tool allows you to rotate all objects in a frame simultaneously, simulating a camera pan.

Using the Thumbnail view, you can quickly reorder the sequence of frames by dragging them into new positions. StoryBoard also lets you link frames regardless of their sequential order—useful for multimedia developers who create nonlinear, interactive productions that require branching. The Link Overview command provides a useful, bird's-eye view of links, but you can't draw links in this mode, which would be much simpler than the current method

of navigating dialog boxes to link frames.

When you've completed your storyboard, you can print it (complete with frame numbers and captions), export it as a QuickTime file, distribute it with PowerProduction's royalty-free PowerPlayer program, or use the slide-show feature to play back all the frames at up to 10 frames per second (depending on your computer's speed and the size of your graphics).

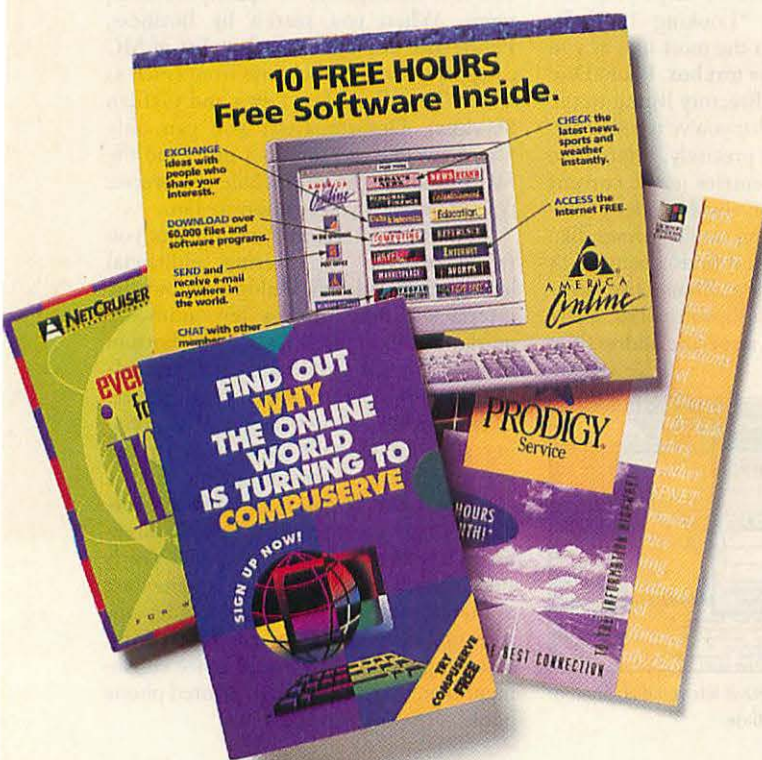
The Last Word While StoryBoard Artist 1.5 is useful for creating quick, sketchy mockups or complex, full-color storyboards, the \$499 list price is too high. Nevertheless, if you have to convey production ideas to a team of producers or multimedia developers, StoryBoard can help bring the pictures in your head to the rest of the world.—CRAIG MCGILLIVRAY



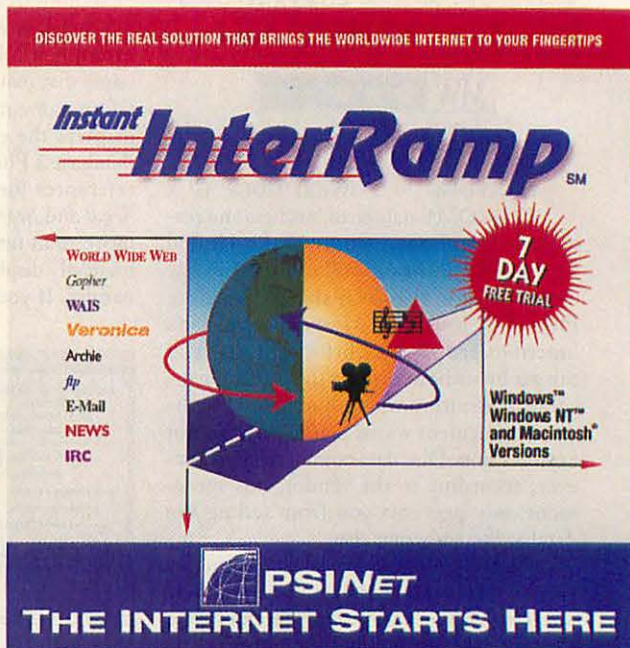
Action! You can quickly create storyboards by placing objects from StoryBoard's library palettes.

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The Lost Mind of Dr. Brain

CD-ROM o' Brainteasers

PROS: Excellent word and logic puzzles; three levels of difficulty; general laugh riot.
CONS: Cheesy introductory and ending animation. **COMPANY:** Sierra On-Line (206/649-9800). **LIST PRICE:** \$44.95.



THE LOST MIND OF DR. BRAIN, A CD-ROM brimming with highly imaginative and thoroughly amusing brain-teasers, provides ten sections of puzzles. Not a single one could be accurately written down, played with a deck of cards, or otherwise manufactured without the interactive give-and-take provided by a computer. This is solitaire like you've never seen it.

The pretense behind solving the puzzles is to restore Dr. Brain's mind, which he has accidentally transferred to his lab rat, Rathbone. Solve 100 percent of each of the ten puzzle areas, and brain and Brain are reunited. The plot is largely unnecessary, and the animated sequence that introduces the story is sufficiently silly to have inspired at least one *Macworld* editor to initially dismiss the CD. But once you get to the puzzles,

the sophistication of the animation and humor jumps dramatically.

Your companions throughout the puzzles are Dr. Brain's neurosurgeon niece, Dr. Elaina, and that shrew of shrewd, Rathbone. Dr. Elaina is ready to offer tips and encouragement at a moment's notice. Rathbone is more inclined to harass, especially when you're trying hardest to concentrate.

The puzzles range from word games to three-dimensional mazes, from memorization tests to simple computer programming. In the Music Region, you have to unscramble a familiar classical ditty by moving and flipping measures. You can select from three levels of difficulty—Novice, Expert, and Genius. Each level affects the current puzzle only; you can easily move up or down a level at any time.

The Last Word Based on my experience, it takes 25 to 30 hours of play to make Dr. Brain a productive member of society again, but you can continue to explore additional variations on the ten basic puzzles long after that. And while this CD is ultimately a collection of brainteasers, most of the puzzles have an arcade quality that inspires an exhilarating, sometimes comical sense of urgency. Even computer game haters—like my wife—will find much



Don't Even Think "Iridium," You Stupid Rat

In my favorite section, Pentode, you have to place matching symbols next to one another. Rathbone (seated, with fuzzy slippers) lets you know which symbol will appear next by chanting its name. Iridium (Ir) is boxed in at the moment, so if Rathbone utters this particular chemical element—as he undoubtedly will, the cruel rodent—I'm sunk.

to like about this CD, and older kids can become just as proficient at solving the puzzles as adults. (The Lost Mind of Dr. Brain is recommended for ages 12 and up.)

But most important, there's no downtime on this disc, no periods when you get hopelessly stuck or have to wander back and forth over increasingly familiar landscapes to locate some obscure clue. This is one of the very few games that I've found absolutely captivating from one hilarious puzzle to the next.—DEKE MCCLELLAND

Nile: Passage to Egypt

CD-ROM

PROS: Appealing to all ages; built-in journal feature aids in writing school reports.
CONS: Needs better navigation tools; tech support available only during business hours.
COMPANY: Discovery Channel Multimedia (301/986-1999). **LIST PRICE:** \$49.95.



A TRIP DOWN THE NILE VIA THE Egyptian sailing craft known as a felucca can set you back \$1000 for a five-day trip, and savvy travelers recommend you pack plenty of Pepto-Bismol. Discovery Channel's Nile: Passage to Egypt CD-ROM, on the other hand, costs considerably less and won't upset your stomach.

Nile: Passage to Egypt, based on a Discovery Channel documentary, tackles a big job. It not only takes the user via felucca the 4000 miles from the Blue Nile and the White Nile to the Mediterranean, but it also tries to span the 5000 years between the glory of ancient Egypt and its modern-day culture. Even more challenging, the CD-ROM tries to appeal to kids (with five built-in games), teens, and

adults. That's quite a lot of water to cover.

Fortunately, like its subject, the CD-ROM has a lot of depth. It's marred only by lapses in its navigational tools and a few other glitches. For instance, as you begin, your tour guide, Samia, sits in the felucca and explains the tools at your disposal. There's everything an adventurous traveler needs, such as a journal, compass, and map. You can interrupt Samia—but there's no rewind; if you want to hear a section again, you must start over.

The journal lets you record your impressions, a handy feature for kids doing reports. A camera lets you snap pictures and



Traveling Tools The navigation tools sit on the prow of your felucca. The high-tech media player launches audio and video descriptions of what you see on the riverbank.

save them in your journal (stored on your hard drive). Unfortunately, the pictures won't print because Discovery Channel acquired limited rights to the photos.

The compass tells you which direction you're heading. You can spin a full 360 degrees, viewing landmarks on the riverbanks. Hot spots in each screen sparkle; clicking on a hot spot plays a short description of the landmark. If you want more info, click on the media player. It displays pictures (lots of these) or videos (not enough of these) that go into more depth on a specific topic. In this regard, the CD-ROM is nicely layered, helping you delve into information as your interest dictates.

The map lets you navigate along the river, picking your destinations. This is a nice tool (stops include Aswân, Luxor, and Lake Tana), but it reveals another navigational drawback. Every time you start the CD-ROM, you're back where you started. There are no bookmarks, so you can't return to exactly where you left off. Similarly, you can't quit without backing up through layers of information and clicking the Quit icon on the felucca's prow.

The Last Word Navigational and licensing nitpicks aside, Nile: Passage to Egypt is a nicely rendered trip down an ancient river, suitable for armchair travelers, history buffs, and students alike.

—HOWARD BALDWIN

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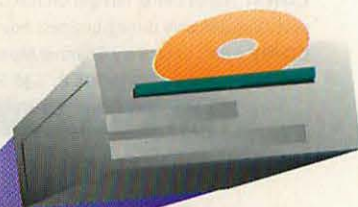
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- ☐ 22. Telecom Carrier
- ☐ 23. Transportation
- ☐ 24. Wholesaling/Distribution/Dealer
- ☐ 25. Other
- ☐ 26. Does not apply

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- ☐ 28. Consultant
- ☐ 29. Database Manager
- ☐ 30. Educator
- ☐ 31. Engineer
- ☐ 32. Financial Analyst
- ☐ 33. General Management
- ☐ 34. Information Systems Manager
- ☐ 35. In-house Publishing
- ☐ 36. Librarian
- ☐ 37. Market Research
- ☐ 38. Marketing/Advertising
- ☐ 39. Media Producer
- ☐ 40. Programmer
- ☐ 41. Production Specialist
- ☐ 42. Records Manager
- ☐ 43. Scientist

- ☐ 44. Treasurer/Controller
- ☐ 45. Training/Personnel Specialist
- ☐ 46. Video/Film Editor
- ☐ 47. Videographer
- ☐ 48. Other
- ☐ 49. Does not apply

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- (Check one)
- ☐ 50. Under 100
- ☐ 51. 100 - 499
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- ☐ 53. 1,000 - 4,999
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Giant Leaps The latest Power Macs sport powerful AV capabilities. The 8500 (top left) is the video producer's dream, while the 7200 and 7500 (the two share the same case design) offer telephony and AV options suited for business users.

Four fast, affordable Power Macs shine with hot new multimedia features

The first of the second-generation Power Macs—the PCI-based Power Mac 9500—offers sheer speed and expansion (see “First of a New Breed,” *Macworld*, August 1995). But the real excitement and innovation come with the follow-on PCI Power Macs recently introduced at the Macworld Expo in Boston: the 7200, 7500, and 8500. Particularly innovative is the incorporation of better AV and telephony technology. And all three new Power Macs use the same revised Power Mac architecture as the 9500, including fast PCI expansion slots and enhanced

that debuted in the 9500: a faster 680X0 emulator, 10BaseT Ethernet connectors, more native Mac OS code, and a fast memory architecture that uses Dual In-line Memory Modules (DIMMs) instead of the Single In-line Memory Modules (SIMMs) that Macs have used until now. Prices, which were still being finalized at press time, range from \$1600 for the basic Power Mac 7200 to \$4000 for the basic Power Mac 8500.

All three new models offer a first for desktop Macs: a variety of energy-saving, PowerBook-like sleep modes. A new

POWER MAC

THE NEXT GENERATION

system software. Plus, the 7500 and 8500 have an upgradable CPU, like the 9500.

First, there's the Power Mac 8500, with its upgradable 120MHz PowerPC 604 CPU—the same as in the 9500/120—and the best built-in multimedia features you'll find on any personal computer. Then there's the 7500, with its foolproof expansion design. And at the low end, there is the 7200, which boasts price/performance ratios that may depress owners of the Power Mac 8100/80.

These new machines are the mainstream second-generation Power Macs—the ones most of us will want on our desks. (You can also expect PCI Macs from Power Computing in September.) While the Power Mac 9500 is speedier than the newer models, it's a specialized system designed primarily with high-end expansion in mind.

Each new Power Mac includes three PCI slots, a quadruple-speed CD-ROM drive, and 8MB or 16MB of RAM. (The table “What the New Power Macs Offer” describes the differences among the PCI Power Macs.) The three newest machines also incorporate the key enhancements

Energy Saver control panel lets you power down the monitor, spin down the hard drive, and put the CPU and/or the entire machine to sleep. The Mac springs back to life when you hit a key, move the mouse, or receive an incoming call. A sleeping 7200 uses less than 30 watts of electricity, making it meet the U.S. government's Energy Star power-saving requirements. The other models reduce their power consumption when asleep, but not to as little as 30w.

These features will make the computers more convenient in homes and small offices and help businesses cut energy costs. The sleep modes also make some telephony applications more practical—it's wasteful to leave a desktop computer on all the time just to answer phone calls or receive faxes, but a new Power Mac can stay asleep until a call actually comes in.

To make room for the new Power Macs, Apple has discontinued several of its older models: the Quadra 950, Quadra 630, Power Mac 8100, Power Mac 7100, and Power Mac 6100. (For at least the rest of 1995, the Performa and LC 640 and 630 remain available, as does

by Jim Heid



the Performa 6100 DOS Compatible.)

The names for Apple's new Macs may seem a bit confusing—why, for example, is the 7500 faster than the 8100, when a bigger number in a model name usually means "better"? In Apple's naming scheme, the first digit represents the series. In that scheme, a 9 means a big tower (like the Quadra 950, Power Mac 9500, or Workgroup Server 9150), an 8 means a minitower (like the 8100 and 8500), a 7 means a traditional desktop case (like the Power Mac 7100 or 7200), a 6 means a flatter desktop case (like the Power Mac 6100; earlier 6 models, like the Quadra 630 and Centris 650, are now part of the 7 series), and a 5 means an all-in-one design (like the Performa 5200).

Within a series, the larger the model's number, the more features it has; a number following the model number, after a slash, indicates the CPU speed. And the *AV moniker* has gone away—you just have to know which models include AV.

Built for Speed

The Power Mac 8500 is the connoisseur's second-generation Power Macintosh. It shares the 9500's PowerPC 604 CPU, although the 8500's is available only at 120MHz, not 132MHz. As in the 9500, the CPU resides on a plug-in expansion card. The 9500, 8500, and 7500 have identical CPU-upgrade slots, which will make trickle-down upgrades possible: for example, a 9500/120 or 8500/120 owner who purchases a 132MHz (or faster) CPU card will be able to pass the 120MHz CPU card along to someone who has a 7500. And as in the 9500, the 8500's internal bus speeds bump up when you install a faster CPU card, boosting video and SCSI performance.

Memory to Spare The 8500's motherboard—a two-sided design crammed with components, including 12 new, Apple-designed integrated circuits—contains eight DIMM memory sockets, which can accommodate up to 512MB of

RAM using 64MB DIMMs, and a full 1GB using 128MB DIMMs. There's also 256K of cache memory. Like the Power Mac 9500, the 8500 provides an internal SCSI-2 Fast bus that can transfer up to 10MB per second. The 8500 will be available with a 1GB internal hard drive or with a 2GB drive; both configurations will include 16MB of RAM.

Upgrades from Other Towers The Power Mac 8500 uses the same minitower case as the Power Mac 8100, Quadra 840AV, and Quadra 800. On the downside, this means that upgrading RAM requires yanking out the motherboard. On the plus side, if you already own a minitower Macintosh, you'll be able to get a motherboard upgrade to turn it into an 8500. Apple estimates the upgrade will cost less than \$2000 and will be available this fall. But keep in mind that your old SIMMs and NuBus cards won't work in the 8500, so factor in funds for RAM or specialized hardware.

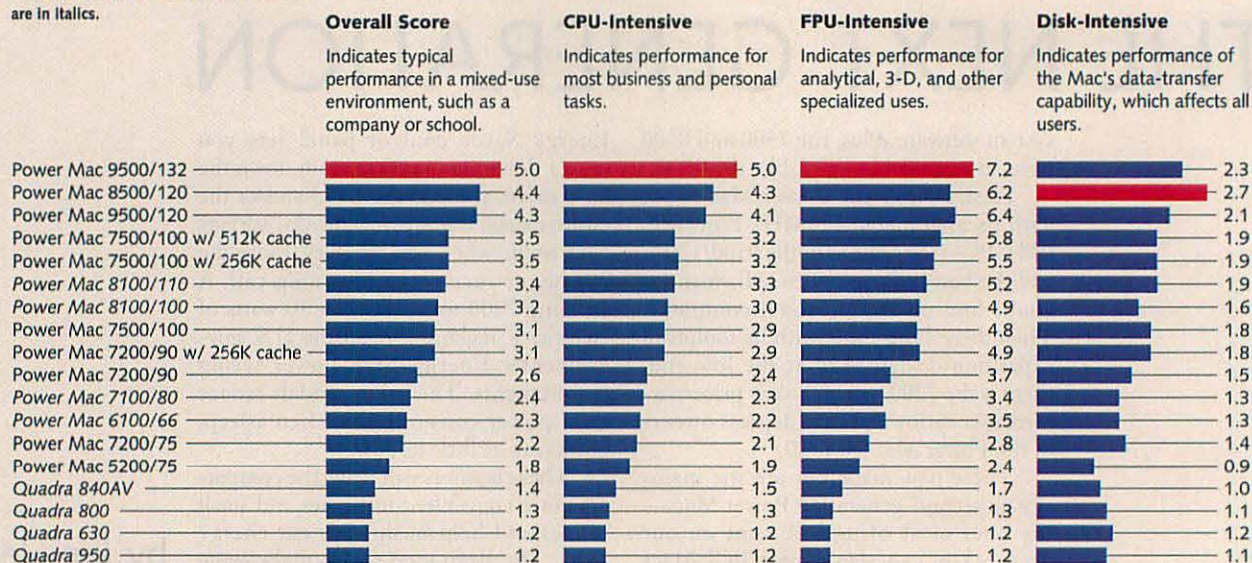


How Fast Are the Latest PCI Power Macs?

■ = Best result in test.
Results are times as fast as a Centris 650 (Centris 650 = 1.0). Longer bars are better. Products are listed in decreasing order of overall performance. Discontinued Macs are in italics.

Apple's latest PCI Power Macs are plenty fast—the multimedia powerhouse 8500/120 is 1.3 times as fast as the speed demon of six months ago, the much costlier 8100/110. Note that having a cache makes a Power Mac

faster (a cache is standard on all models tested except for the 7200 and 7500), but a bigger cache (512K versus 256K) offers no significant advantage.



BEHIND OUR TESTS

Macworld Lab tested several functions in eight key applications plus the Finder to determine real-world performance for the three critical performance areas faced by most users: the CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for operations that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files.

We then averaged the results to determine the Overall Score, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each.

These results are comparable with *Macworld* benchmarks published since the January 1995 issue. We tested native versions of software on the Power Macs and 680X0 versions on the 040 Macs. The software included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our Power Macs had 24MB of RAM, while 680X0 Macs had 16MB. All systems were run with 8-bit color on 17-inch color monitors.—**Macworld Lab testing supervised by Mark Hurlow and Tim Warner**

8500: AV Made EZ

The Power Mac 8500's video-display, video-input, and video-output features are dramatic improvements over those of the earlier AV Power Macs and the pioneering Centris/Quadra 660AV and Quadra 840AV. The result is an ideal machine for multimedia production and an excellent foundation for high-end video work. And note that there is no non-AV 8500; the following features are standard equipment.

Sizzling Video Display Unlike the 9500, the 8500 includes on-board video circuitry—and how. A new, 64-bit video memory (VRAM) scheme makes for fast window redraws and sizzling scrolling. The machine includes 2MB of VRAM, expandable to 4MB using two 1MB VRAM SIMMs. Equipped with 4MB of VRAM, the 8500 can display millions of colors (24-bit video) on monitors with resolutions of up to 1152 by 870 pixels (the standard for a 21-inch monitor), and thousands of colors (16-bit video) at a resolution of 1280 by 1024 pixels—a resolution used for professional image retouching that no Mac's on-board video has provided until now.

All this video horsepower terminates in a high-density monitor connector—the same kind of connector found on first-generation Power Macs. It also provides pass-through wires for the Apple Desktop Bus and for audio input and output, eliminating the spaghetti of cables when used with a monitor such as Apple's new AudioVision 17.

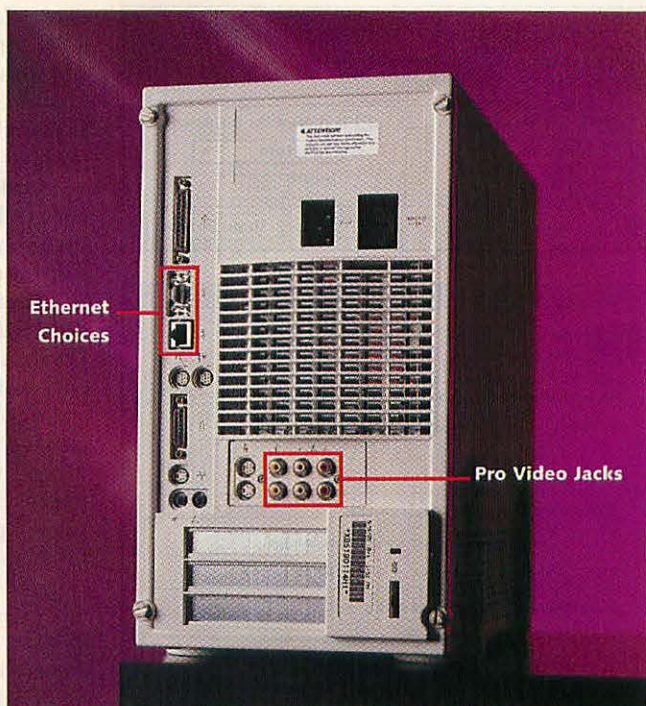
That high-density connector is the only monitor port that you will find: unlike first-generation Power Macs, none

of the second-generation machines come equipped to drive two monitors. That saves Apple some cost by eliminating a feature that most users don't need. Equipped with 4MB of VRAM, however, the 8500 can simultaneously drive a monitor and a video device such as a TV monitor or camcorder.

Video Connections For getting video into the 8500, there are S-Video and composite-video input jacks (see the photograph "Multimedia Options"). AV Power Macs, by comparison, lack composite inputs and rely on an easy-to-lose adapter cable to connect with composite gear.

The 8500's motherboard has a Digital Audio Video (DAV) connector that lets third-party cards tap directly into the machine's digitizer. Existing DAV cards such as Radius's SpigotPower AV won't work—the 8500's DAV slot isn't compatible with those of earlier AV Macs. Radius and RasterOps' Truevision subsidiary plan to be prompt in shipping PCI-based digitizing boards.

The 8500's video-output capabilities are also dramatically better than those of previous Power Macs. The same basics apply: you can connect a video device—camcorder, VCR, TV monitor—and tape or display QuickTime movies, screen activity, or presentations. Beyond that, everything is new and improved. The 8500 can display 24-bit video on a video device; previous AV models were limited to 16-bit video, which caused color banding. At least as important, when you upgrade the 8500's VRAM to a full 4MB, you don't have to shut down the computer's monitor to send the screen image to a video



PAUL FRANZ-MOORE

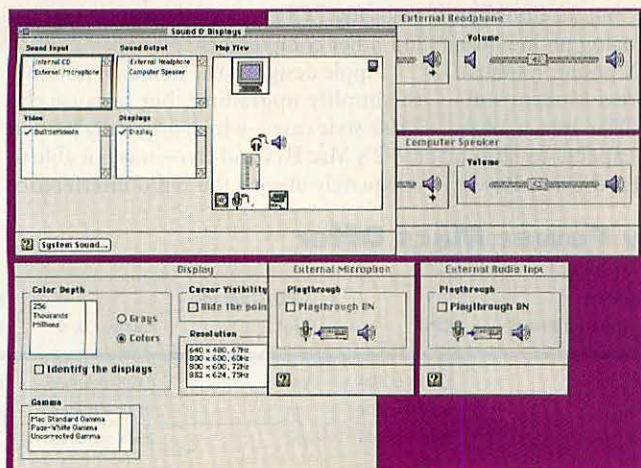
Multimedia Options The Power Mac 8500 adds to the usual bevy of Macintosh ports two significant sets of connectors. One set is Ethernet, for which there is one standard AAUI port (which requires a transceiver) and a 10BaseT port (for which the transceiver is built-in). The other set is video in/out, providing input and output connections for S-Video and composite-video devices.

device: instead, you can set up the 8500 to mirror its screen on both the monitor and the video device, or to treat the video device as a second monitor. With the stock 2MB of VRAM, the 8500 works similarly to previous AV Macs—when video-out is active, the monitor goes dark.

The 8500 also supports a hardware zoom feature that lets you fill the screen with a QuickTime movie whose actual dimensions are 320 by 240 pixels (quarter-screen resolution). QuickTime 2.0 supports a software-only full-screen playback mode, but it uses pixel doubling—it simply duplicates each horizontal and vertical pixel. The 8500's hardware zooming, by comparison, actually creates new pixels based on the movie's existing ones, a process called interpolation.

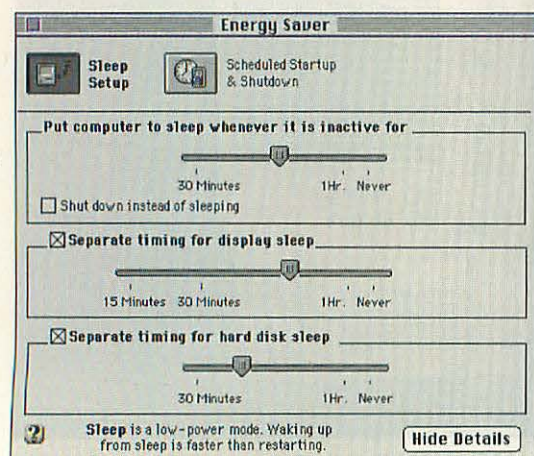
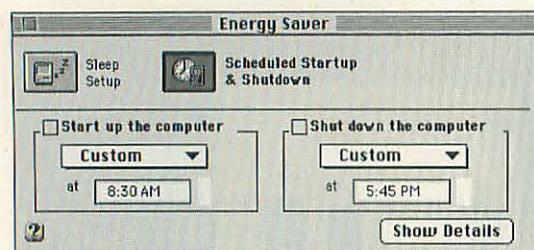
Fuller-Motion Video Like earlier AV Macs, the 8500 can display full-screen, 30-frames-per-second (fps) video using the included Apple Video Player program, which is similar to that supplied with the Quadra and Performa 630. You can also use Apple Video Player to digitize video, or use a program such as Adobe Premiere or Avid VideoShop—in fact, the full version of VideoShop 3.0.2 is bundled with the 8500.

At a press briefing for *Macworld* editors, Apple showed a stock 8500 captur-



Full Control The new Power Macs introduce a new Sound & Displays control panel, which integrates the previously separate control panels that manage sound in/out, monitor, and video in/out settings. A graphical mode, or Map View, lets you see iconically what kinds of devices are connected (such as video cameras, microphones, and monitors).

previous AV models were limited to 16-bit video, which caused color banding. At least as important, when you upgrade the 8500's VRAM to a full 4MB, you don't have to shut down the computer's monitor to send the screen image to a video



Save Energy, Save Money The Energy Saver control panel (collapsed at top and open to the Sleep Setup panel at bottom) in the new Power Macs lets you regulate your Mac's power usage, keeping energy costs down. Based on the software introduced with the PowerBooks, the Energy Saver control panel adds scheduled start-up and shut-down capabilities to the more familiar sleep controls.

ing 30 fps at a quarter-screen movie size (320 by 240 pixels, a standard size for CD-ROM-based QuickTime movies). Previous AV Macs could muster only between 8 and 15 fps (see "Advanced AV Options," *Macworld*, August 1995). According to Apple, the movie quality is better, too.

Capture capabilities like these would seem to make the 8500 a natural for CD-ROM production. However, quality-obsessed CD producers sometimes capture movies at full-screen sizes and then use Adobe After Effects software to scale down to a quarter-screen size, since this tends to provide better image quality. These folks—as well as video producers who need full-screen, 60-fields-per-second captures—will need to add third-party hardware. Such hardware can cost as little as \$1500.

Better Audio, Too In developing the 8500, Apple didn't neglect the A half of the AV equation, either. The 8500 sports audio line-input and -output jacks—the same kind of RCA phono jacks used in stereo equipment and on VCRs. This means that audiophiles need not use those cheesy 1/8-inch stereo miniplugs (although they are still provided on the 8500). There is a genuine audio-quality benefit to not using miniplugs: they are prone to

cross talk (one channel's signal leaking into the other channel) and noise. Apple also says it fine-tuned the audio circuitry to provide cleaner sound than previous Macs offer.

Studio Software For controlling this audiovisual studio-in-a-box, there's a new control panel, named Sound & Displays (see the screen shot "Full Control"). Sound & Displays provides a graphical view of the machine's sound and video capabilities and simplifies the process of configuring monitors. It also improves on the Monitors control panel that it replaces; for example, you don't have to restart after dragging the menu bar from one monitor to another, and you can activate display mirroring by simply dragging one display's icon over another's. You can also control any video device that's

attached to the Macintosh.

One more software enhancement is a desktop version of the Control Strip that debuted on last year's PowerBook 500 series, with new modules that let you switch monitor settings without using the Sound & Displays control panel. The Control Strip is also included on the new Power Mac 7500.

Talk to Me Apple has bundled Cypress Research's MegaPhone software so you can set up the Mac to send and receive faxes and to receive voice mail—if you have a GeoPort Telecom Adapter. Often called a pod, this paperback-size device is not a modem, but an interface between the Mac and analog phone lines (it won't work with PBX phone systems). The GeoPort and Express Modem software essentially turn a Mac into a 14.4-Kbps modem. (Apple expects to ship a software upgrade that lets the new Power

Macs' GeoPorts run at the speed of a 28.8-Kbps modem later this year.)

7500: The Expandable Middle Class

The Power Mac 7500 represents the midrange in the lineup, providing many of the most innovative features of the second generation at a reasonable price of \$2800 for the basic unit.

As mentioned earlier, the 7500's 100MHz PowerPC 601 chip resides on the same type of upgradable CPU card used by the 8500 and 9500. (Indeed, the 7500 is built to accommodate up to a 150MHz PowerPC 604.) The eight DIMM slots house up to 512MB of RAM. Another slot can accommodate a cache card, which is not included. Cache cards generally increase performance by 10 to 20 percent. Note that the new Macs' cache card is not compatible with the Power Mac 6100, 7100, or 8100.

The 7500's on-board video subsystem is identical to that of the 8500: the motherboard's 2MB of VRAM is expandable to 4MB, and monitor support and resolutions are the same. Apple offers a choice of 500MB and 1GB hard drives.

Easy Upgrading Adding memory upgrades to the 7500 is a cinch. Flick two plastic latches to remove the top of the case—no screws. Inside, the storage devices and power supply are mounted on a hinged chassis that swings up to allow complete access to the motherboard beneath (see the photo "Built for Upgrades"). The case also has an additional bay that accommodates a 3½-inch device, such as a second internal hard drive. Another nice touch is an easily removed baffle over the expansion slots that protects any PCI cards while you're upgrading other components.

Apple designed the new case not only to simplify upgrading, but because the 7100-style case—which originally housed 1992's Mac IIvx and IIvi—was not able to adequately absorb the radio interference

What the New Power Macs Offer

System	Apple's Estimated Price ^A	CPU	CPU-Upgrade Slot	Cache Card	PCI Slots
Power Mac 9500/132	\$5800	132MHz 604	yes	512K included	6
Power Mac 9500/120	\$5000	120MHz 604	yes	512K included	6
Power Mac 8500/120	\$4000	120MHz 604	yes	256K included	3
Power Mac 7500/100	\$2800	100MHz 601	yes	optional	3
Power Mac 7200/90	\$2100	90MHz 601	no	optional	3
Power Mac 7200/75	\$1600	75MHz 601	no	optional	3

^A For base models. ^B Requires third-party video card. ^C 4MB of VRAM supports 24-bit color at 1152-by-870-pixel resolution 832-by-624-pixel resolution.

PCI Macs Push Multimedia Performance

Two key performance areas for multimedia power users are disk access and video, since these can slow down an otherwise fast system by preventing the CPU and the system's Direct Memory Access (DMA) RAM from getting the data they need. Because so much data is processed in multimedia creation and presentation, the effects quickly become noticeable as lost video frames, dropped sound, and slow screen refresh. The new Power Macs' improved multimedia performance is the result of a better motherboard architecture, Mac OS improvements, and the PCI bus.

Disk The benefits of PCI show up best with storage performance on a Level 0 RAID array, which many multimedia producers use for their tremendous storage needs. When we coupled the Power Mac 8500/120 with a prototype dual-card SCSI accelerator card (FWB's JackHammer for PCI) and two of FWB's SledgeHammer 4000FMF arrays of SCSI-2 Wide drives, our tests showed a 96-second improvement over even the fastest SCSI Level 0 RAID system we

found on a Power Mac 8100/80 (a dual Atto SiliconExpress IV SCSI card with Seagate drives). That's 46 percent faster. Thanks to the improvements in its SCSI architecture, even the 8500's internal 2GB drive finishes 25 seconds faster (12 percent) than the 8100/80 with an array. What you gain from the PCI technology are uncompressed full-motion video and multiple video streams.

Video Improvements in video performance with PCI are less dramatic, but still evident. A suite of scrolls at 24-bit color depth took 22 seconds, less time (20 percent) on the 8500/120 equipped with a prototype Radius PrecisionColor 8/1600 than on the 8500's internal video. However, at 8-bit color depth, the difference is nearly a wash. Surprisingly, the Radius Thunder IV on an 8100/110 is faster by 11 seconds (13 percent) than even a PCI card, but tests of a prototype ThunderColor board in a 9500 suggest that the ThunderColor will take only 73 seconds when combined with an 8500, besting the fastest 8100 system we tested by 3 seconds.



Where PCI Cards Push Past NuBus

In order of overall performance from fastest to slowest. Shorter bars are better. Times are in seconds and are the totals for all tests in each category.

Disk Access: PCI's Big Effect

Dual FWB JackHammer array on 8500/120 (PCI)	114
8500/120 internal drive	185
Dual Atto SiliconExpress array on 8100/80 (NuBus)	210
8100/80 with internal drive (Seagate ST32550)	411

Video: A Noticeable Difference

Radius Thunder IV on 8100/110 (NuBus)	76
Radius PrecisionColor 8/1600 on 8500/120 (PCI)	87
8500/120 internal video	109
8100/110 internal Video	162

BEHIND OUR TESTS

For disk performance, Macworld Lab measured the total time to transfer 20MB, 40MB, 80MB, and 160MB files; open and save a 40MB Adobe Photoshop file; and duplicate a 40MB file in the Finder. For video performance, Macworld Lab measured total time needed to scroll horizontally and vertically in several programs. We used the Power Macs' internal video circuitry (with 4MB of video RAM for the 8500) and a

prototype Radius PrecisionColor 8/1600 video card. We tested on a 17-inch monitor, although monitor size does not affect relative performance among cards and video circuitry.

We measured total times because differences in processor performance between the 8500 and earlier Power Macs make direct comparisons of NuBus and PCI misleading.—Macworld Lab testing supervised by Tim Warner

generated by the fast CPUs the new models use. The downside is that no upgrade to the 7500 will be available for the Power Mac 7100 or earlier Macs using the same case (the Iivi, Iivx, Centris 650, and Quadra 650). The move is understandable, but Apple can still expect some complaints from customers who recently bought 7100's and now find themselves

unable to upgrade to the second generation. After all, Apple had indicated for several years that it would ensure basic case designs wouldn't change enough to prevent future upgrades.

Power Mac 6100 owners are also likely to squawk, since their Mac has been discontinued and there is no similarly designed new Mac to upgrade to. Apple

has released the Power Mac 6200 but it does not support PCI.

Videoconferencing, Not Video Editing

The 7500 lacks the 8500's video-out ports and print-to-video features, but it does provide identical video-input features: S-Video and composite-video input jacks; full-screen, full-motion video play-through; and QuickTime movie captures (30 fps at quarter-screen sizes, according to Apple). It also provides the RCA jacks for audio in and out, and a DAV slot on the motherboard.

Why leave out the video-out? Because Apple is positioning the 7500 as a business-oriented Mac whose video features are ideal for videoconferencing—the 7500 includes Apple's QuickTime Conferencing software. This sensible strategy reduces the machine's cost without gutting its multimedia capabilities. (CD-ROM producers and QuickTime tinkerers generally don't need video-out features, and if they do, third-party video-out hardware is relatively inexpensive.) And if videoconferencing ever does take

DIMM Slots	VRAM (Base/Maximum)	AV Features	Telephony Features
12	none/none ^a	16-bit stereo in/out	GeoPort
12	2MB/4MB ^{a, c}	16-bit stereo in/out	GeoPort
8	2MB/4MB ^c	16-bit stereo in/out, RCA jacks, 24-bit video in/out ^d , DAV slot	GeoPort, fax/modem/voice mail software, QuickTime Conferencing
8	2MB/4MB ^c	16-bit stereo in/out, RCA jacks, 24-bit video in ^d , DAV slot	GeoPort, fax/modem/voice mail software, QuickTime Conferencing
4	1MB/4MB ^e	16-bit stereo in/out	GeoPort, fax/modem/voice mail software
4	1MB/2MB ^e	16-bit stereo in/out	GeoPort, fax/modem/voice mail software

and 16-bit color at 1280-by-1024-pixel resolution. ^a S-Video and composite video. ^c 2MB of VRAM supports 24-bit color at

off, the 7500 is ready for it—once you buy a video camera.

In the meantime, Macworld Lab's speed tests indicate that the 7500 can handle just about anything else.

7200: Not-So-Low End

Redefining the low end of the Power Mac line is the Power Mac 7200, available in 75MHz and 90MHz speeds. Yes, the new low-end Power Mac has CPU speeds that approach or exceed those of the original high-end Power Mac, the 8100/80.

The 7200 uses the 7500's new case design and will be upgradable to a 7500 via motherboard swaps that Apple expects to make available in mid to late 1996. There's no CPU-upgrade slot, so a motherboard swap is the only way to increase the 7200's speed. With its three PCI slots, the 7200 provides a degree of expandability that previous entry-level business Macs—the Power Mac 6100 and Quadra 630, now discontinued—never could.

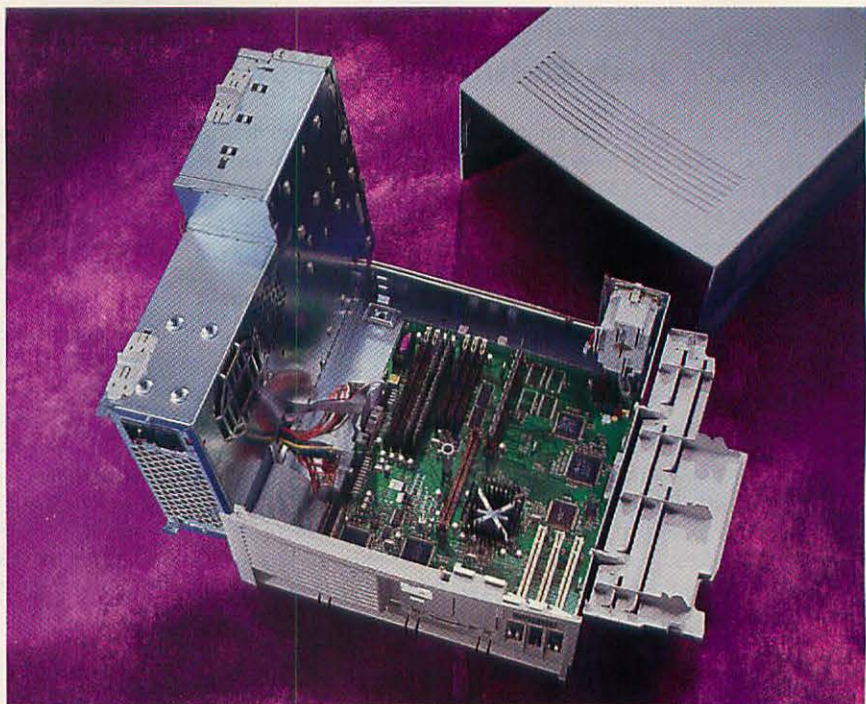
To arrive at the 7200's price of \$1600 (75MHz) and \$2100 (90MHz), Apple had to omit some features that the 7500 and costlier Macs provide. First to go was the CPU upgrade slot. Other omissions include the high-density AV connector (the low-end machines have a standard DB-15 monitor connector); RCA audio ins and outs (the low-end machines still have miniplugs); and the microphone that comes with the 8500 and 7500.

The 7200 accepts less RAM than the 7500 or 8500: its four DIMM slots allow for up to 256MB of RAM with 64MB DIMMs. The cache and RAM buses are 64 bits wide, as opposed to the faster 128-bit buses in the 7500, 8500, and 9500. As with the 7500, no cache is included, although you can add one.

The two 7200 models have similar on-board video features, although the 7200/90 goes a bit further than the 7200/75. Both include 1MB of video RAM; the 7200/75 can be upgraded to 2MB (allowing for 24-bit color on 16-inch monitors), while the 7200/90 supports up to 4MB. In their stock configurations, the machines use a 32-bit-wide graphics bus; when upgraded, the VRAM DIMMs interleave to 64 bits wide. Hard drive options are the same as for the 7500: 500MB and 1GB.

Early Adopters' Dilemma

Whatever PCI Power Mac is right for you, be aware that PCI is a new technology for the Mac, and it may be a while before PCI options have all their kinks worked out or are fully available. It's typical that new technologies have flaws that appear only when they're shipping, since companies can't test for every possible combination of hardware, software, and



Built for Upgrades The new case design for the Power Mac 7200 and 7500 lets you swing out the power supply and slot-bay covers so you can easily add memory and cards.

setup. For example, the version of the Mac OS that comes with the PCI Power Macs, System 7.5.2, has several software and hardware incompatibilities that you may have to contend with (see "System 7.5.2 Fixes," *News*, in this issue).

Many companies have announced PCI cards since the Power Mac 9500 shipped on June 19. ("First Add-on Cards for the New PCI Macs," in September 1995 *News*, plus ongoing coverage in *Macworld's* news and *New Products* sections, offer information on PCI cards.) But Macworld Lab has been unable to get any company to send a shipping version of its PCI cards, even six weeks after the first cards were slated to ship. Companies were even loathe to send prerelease versions.

That's worrisome; companies usually make sure leading magazines get a first look at new products, and such a shortage can indicate that products really aren't ready. While no one would admit that the PCI announcements were premature, *Macworld* editors sense that's what's going on. Why should you care? Because it indicates that you may need to be cautious about adopting the first set of PCI cards; wait until you're sure the initial kinks have been worked out. Look to reviews of PCI products in future issues of *Macworld* to gauge when it's safe to adopt them.

The Last Word

The latest Power Macs take the basic architectural advances developed for the

9500 and combine them with features aimed at typical users' needs. The 8500 is clearly the choice for color publishers, multimedia producers, and engineers—the 9500 may be faster, but it requires you to add several third-party cards to get what the 8500 has built in. The 7500 is clearly the power user's desktop Mac, with enough audiovisual and telephony technology to let you dabble in videoconferencing, voice mail, and motion-video capture. The 7200 is the Mac that most of us will buy, since it provides great performance without all the bells and whistles that inflate the 7500's price.

But keep in mind that with slower memory architecture and no upgradable processor, the 7200 also offers less room to grow than the 7500. If you anticipate needing more speed in the near future (and who doesn't?) or wanting to dabble with digital video, you might consider spending the extra money for the 7500.

With the 7200, 7500, and 8500, the Power Mac line is no longer hamstrung by circa-1987 limitations such as SIMMs and NuBus slots. Better still, Apple has crafted a product line whose members have not only strong common denominators—three PCI slots and great performance—but also have important differences that address the needs of specific types of users. And best of all, the leading-edge technology they offer is surprisingly affordable. ■

Contributing editor JIM HEID wishes he'd had a Power Mac 8500 when producing the CD-ROM for his *Macworld Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

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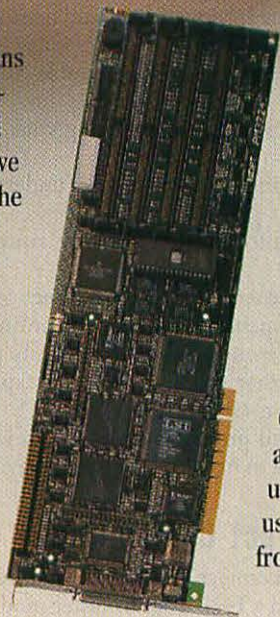
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Make the **Right** Connection

You know the Internet is the place to be. Macworld shows you how to get there.

Vast, dense, and somewhat mysterious, the Internet looms and beckons like an untamed jungle. To the uninitiated, it may appear impenetrable, yet the lure is undeniable. While Internet travel is rewarding, negotiating your way there can make you feel a bit like Stanley hacking through the lush undergrowth to find the missing Livingstone. We explored the two main routes to the

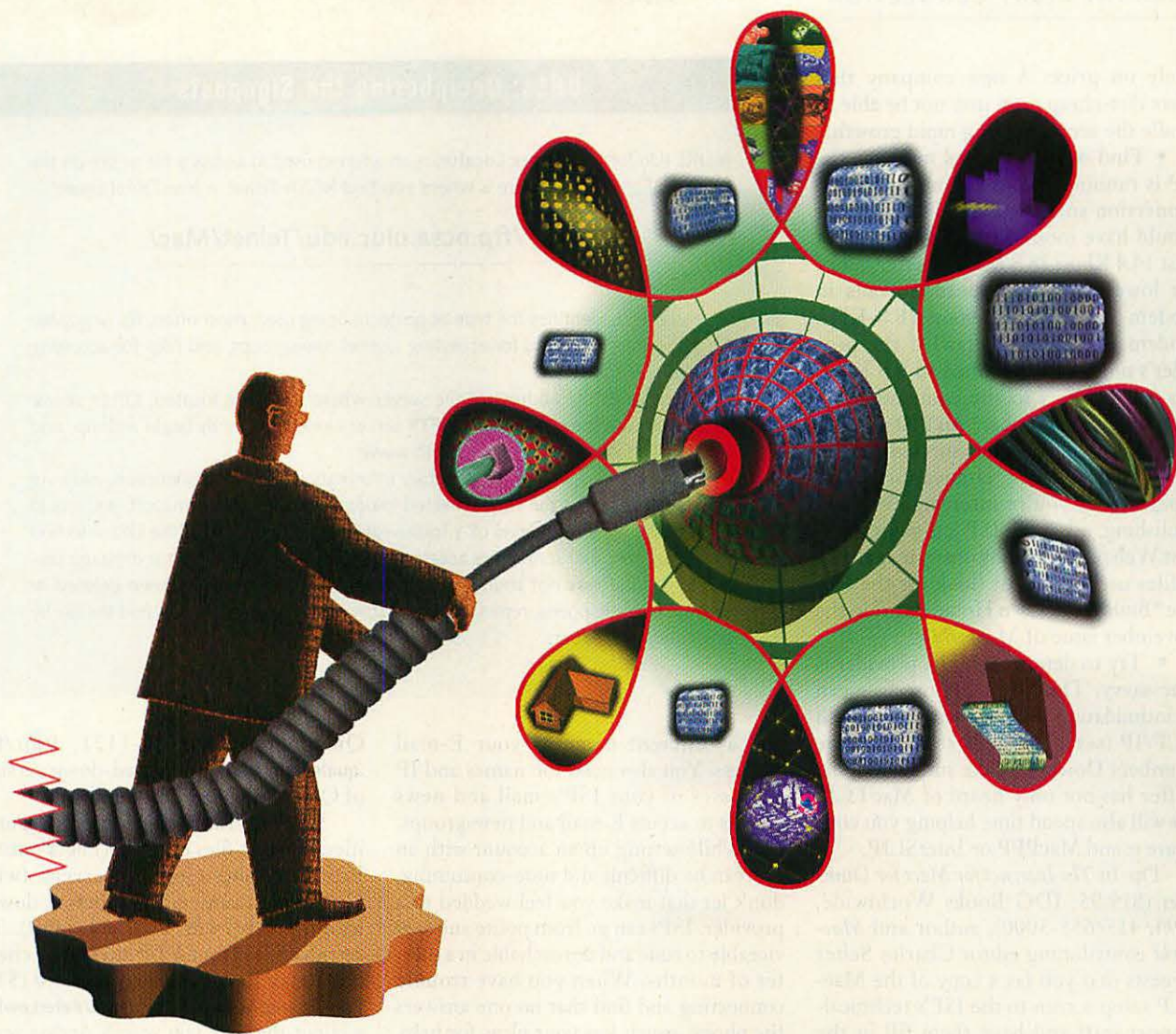
Internet: establishing a direct connection and using a commercial online service (the route you pick depends partly on whether you're a hardened explorer or a sedan-chair tourist). Here's what we found on our journey, along with guidance to help you find your way.

Direct Connections

To connect directly to the Internet, you need a 14.4-Kbps or faster modem; MacTCP software, the Macintosh version of TCP/IP (a transport protocol that carries data on the Internet); an account with an Internet service provider (ISP); a dialer, which is software for connecting to an ISP; and client software to go to all the places you've heard you *must* check out on the Net.

MacTCP comes with System 7.5, Apple sells MacTCP for \$59 (408/996-1010), and some ISPs provide it; don't use a version earlier than 2.0.6. MacTCP provides a control panel for typing in and configuring your IP (Internet Protocol) address, which lets other machines on the Internet locate you. An inexpensive way to get MacTCP is to buy a copy of *The Internet Starter Kit for Macintosh*, third edition, by Adam Engst (\$29.95; Hayden Books, 1995; 317/581-3500). It's a useful book that comes with several indispensable pieces of Internet software.

You get an IP address when you set up an account with an ISP. Those accounts use either PPP (Point-to-Point Protocol) or SLIP (Serial-Line Internet Protocol) to connect you remotely to the provider's Internet connection. While either protocol will do the job, PPP is generally a better choice. More and more ISPs are selling PPP accounts—partly because the PPP software is more reliable than the SLIP software.



The catch-22: the software you need to get hooked up to the Internet is *on* the Internet. To address this problem, many ISPs provide Internet software by postal mail or through electronic bulletin board systems that you access by modem. On-line services and user groups also often offer the software to members. If you have access to a Net-savvy online service or a friend's Internet account, you can get the software directly from the Internet using the appropriate address, called a URL (Uniform Resource Locator), or at *Macworld's* new World Wide Web site, <http://www.macworld.com>. (See the sidebar, "URLs: Deciphering the Signposts," for an explanation of Internet addressing.)

To obtain a dialer, try out Merit Network's MacPPP 2.0.1, a free PPP dialer, available from <ftp://ftp.merit.edu/internet.tools/ppp>, or InterCon Systems' InterSLIP, free from <ftp://ftp.intercon.com>.

Choosing a Service Provider

Setting up an account with an ISP can be a chore or a breeze, depending on many

variables, mostly your choice of ISP. For instance, an ISP can make setup significantly easier by providing software that installs preconfigured versions of MacTCP and a SLIP or PPP dialer.

How do you choose an ISP?

- Consult your local user group and computer magazines. If you can use a friend's account to access the Web, visit http://www.yahoo.com/Business/Corporations/Internet_Access_Providers/, which has hot links to a host of ISPs (these links allow you to jump directly to an ISP's own Web site).

- Call the providers you're considering. Pay attention to details: did someone answer the phone promptly? Examine the pricing information. Does the ISP charge by the hour, or does it have a flat rate? Estimate your usage and do the math. If you're a frequent user, flat rates of less than \$40 that include unlimited hours may be cheaper than hourly rates. However, if you access the Internet only for a few hours on the weekend, an hourly fee may be better. Also, don't pick an ISP

by
Cameron Crotty
and
Joanna Pearlstein

solely on price: A new company that offers dirt-cheap rates may not be able to handle the accompanying rapid growth.

- Find out what speed modems the ISP is running and what your maximum connection speed will be. The provider should have modems with speeds of at least 14.4 Kbps; 28.8 Kbps is better. Since the lowest common speed prevails in modem connections, your 28.8-Kbps modem will seem to crawl if the provider's modems are limited to 9.6 Kbps. Do you connect to the company via a local or an 800 number? An 800 number may sound cheaper, but surcharges can make that type of connection more expensive. If you're interested in Web publishing, ask if the ISP lets subscribers post Web pages and how many megabytes of files users can post (look for the feature "Build Your Own Home Page" in the November issue of *Macworld*).

- Try to determine if the provider is Mac-savvy. The MacTCP interface can be intimidating if you're unfamiliar with TCP/IP (see the screen shot "Get the Numbers Down"). Make sure a support staffer has not only heard of MacTCP, but will also spend time helping you configure it and MacPPP or InterSLIP.

Tip: In *The Internet for Macs for Dummies* (\$19.95; IDG Books Worldwide, 1994; 415/655-3000), author and *Macworld* contributing editor Charles Seiter suggests that you fax a copy of the MacTCP setup screen to the ISP's technical-support staff and have them fill in the appropriate information and fax it back.

A common problem in PPP and SLIP connections is an incorrect modem string; without the right string, your modem won't connect to the ISP's modem. Ask the ISP or the modem maker for an initialization string for your modem.

Make sure you know both the log-on name and the user name for your account; you may use one name with your dialer

URLs: Deciphering the Signposts

A URL (Uniform Resource Locator) is an address used to access a file or site on the Internet. For example, here is where you find NCSA Telnet, a free Telnet client:

ftp://ftp.ncsa.uiuc.edu/Telnet/Mac/

1 2 3

1. A URL identifies the type of protocol being used: most often, *ftp* or *gopher* for retrieving files, *news* for accessing Usenet newsgroups, and *http* for accessing the World Wide Web.

2. It gives the address of the server where the file is located. Often server names indicate the type of server; FTP server names frequently begin with *ftp*, and World Wide Web server names, with *www*.

3. The URL specifies the directory information for the file's location, allowing you to go directly to the correct nested folder. Without this information, you would have to navigate each level of a folder—delimited by a slash in the URL—to find the designated file. Sometimes accessing a URL can produce an error message saying that a file was not found. This usually means the file has been deleted or moved. If this happens, remove the directory information and try to find the file by navigating the folders.

and a different name as your E-mail address. You also need the names and IP addresses of your ISP's mail and news servers to access E-mail and newsgroups.

While setting up an account with an ISP can be difficult and time-consuming, don't let that make you feel wedded to a provider. ISPs can go from polite and serviceable to rude and unreachable in a matter of months. When you have trouble connecting and find that no one answers the phone, much less your pleas for help, consider switching providers. However, if you switch, you'll have to reconfigure your software and resubscribe to mailing lists with your new user name.

Accessing the Net

Once you've set up your Internet connection, you need client software to access the different parts of the Internet. Either you can cobble together the different tools, which gives you flexibility and can save you money, or you can buy a commercial all-in-one package, which offers the convenience of preconfigured TCP/IP and client software with a SLIP or PPP account.

To access the World Wide Web, the most graphically rich part of the Internet, you need a Web browser; the feature "Pick the Best Browser" in this issue reviews these programs in depth.

If you choose to gather your own software, the product of choice for accessing E-mail is Eudora Light (free;

Qualcomm; 619/587-1121, <ftp://ftp.qualcomm.com>), a slimmed-down version of Qualcomm's \$65 Eudora Pro.

You'll find a wealth of shareware, utilities, and text files on FTP (File Transfer Protocol) and Gopher servers (with Gopher you can read files before downloading them; with FTP you can't). To retrieve files from FTP sites, first check out Peter Lewis's Anarchie 1.4.0 (\$10; <ftp://ftp.nig.ac.jp/pub/pub/mac/PeterLewis>), a client that lets you search Archie servers, which contain the directories of FTP services. Dartmouth College's Fetch 2.1.2 (free for educational and nonprofit groups, \$25 for other users; <ftp://ftp.dartmouth.edu>) and the University of Minnesota's TurboGopher 2.0 (free; <Gopher://boombbox.micro.umn.edu:70/11/Gopher/M>) work well for retrieving files from FTP and Gopher servers. For an AppleScript-able FTP client with more features, try Software Ventures' Snatcher 1.0 (\$49.95; 510/644-3232).

Telnet lets you access Internet sites or accounts remotely. Telnet is sometimes used to check mail on other Internet accounts (for example, to check your work account from home) or to access catalogs or databases not available via FTP or Gopher. A reliable Telnet client is NCSA Telnet 2.6 (free; <ftp://ftp.ncsa.uiuc.edu/Telnet/Mac/>). NewsWatcher 2.0 (free; <ftp://ftp.acns.nwu.edu/pub/newswatcher/>), by John Norstad of Disinfectant fame, is a well-designed, easy-to-understand news-gopher reader.

You can also read news and retrieve files through a Web browser, although stand-alone applications for those functions provide more features.

Get the Numbers Down MacTCP will help you get to the Internet, but you need to decipher it first. **Tip:** Fax a copy of this screen to your ISP's tech-support staff; ask them to fill in the numbers and send it back to you.

Another Option: All-in-One Products

While commercial all-in-one packages—the alternative to the do-it-yourself patchwork approach—simplify setup, we found that they're not problem-free.

Performance Systems International (PSI; 703/904-4100), which recently acquired InterCon and Software Ventures, bundles a PPP account with either InterCon's TCP/Connect II Remote (see the feature "Pick the Best Browser") or Software Ventures' MicroPhone LT; the package, called Interramp, costs \$50 for an activation fee, plus \$9 per month for 9 hours of access, or \$29 per month for 29 hours of access. Two other products are Software Ventures' Internet Valet 1.01 (\$49.95; 510/644-3232) and InterCon Systems' soon-to-be-released NetShark (\$99.95; 703/709-5500).

Both versions of Interramp combine mail, news, Gopher, FTP, and Web access. A major disadvantage of TCP/Connect II is that other Internet clients—such as Netscape Communications' Web browser, Netscape Navigator, don't work with it. Accessing mail, news, and the Web was fairly straightforward—when we could make TCP/Connect II work. We experienced a system crash, software problems, and modem difficulties.

We also had problems with MicroPhone LT. You can't configure MicroPhone LT to dial 9 to access an outside line, an inexcusable inflexibility. Once we got past that barrier (by using a home phone), MicroPhone worked quite well. Unlike TCP/Connect II, MicroPhone lets you use any Internet client—thankfully, since we weren't crazy about the MicroPhone mail and news clients.

Software Ventures' Internet Valet includes tried-and-true software products: MacTCP, MacPPP, Eudora, NewsWatcher, Fetch, TurboGopher, Enhanced Mosaic, and MicroPhone Telnet, all of which can be opened from the product's launcher palette (based on Binary Software's Square One technology; see the screen shot "Valet Service"). It includes a free two-week Interramp account. You can also use your own service provider. Internet Valet's advantages are its inclusion of MacTCP, its ease of use, and its comprehensive but index-deficient manual.

The mostly easy setup of an all-in-one package doesn't come cheap. In contrast, some ISPs charge around \$30 for unlimited hours of use. Plus, some ISPs offer nearly equivalent bundles, only without the name and nice packaging.

If you want to get a taste of the Internet before going through the work of finding an ISP and setting up a direct con-

nection, or you want to explore another route to the Internet, look into yet another option: online services.

Online Services

You'd think that the traditional commercial online services—America Online, CompuServe, Delphi, eWorld, GENie, and Prodigy—would be leading the pack in bringing the Internet to the general public. Guess again.

With any of the online services, you can begin some rudimentary Internet explorations, guided by knowledgeable members of your online community, without the extra hassle of setting up a SLIP or PPP connection. But what you get isn't pretty. All of the services are working on new software, but at the time

surfers, AOL is head and shoulders above the rest of the online services. eWorld, Apple's online service, shares that distinction, since it licenses AOL's software.

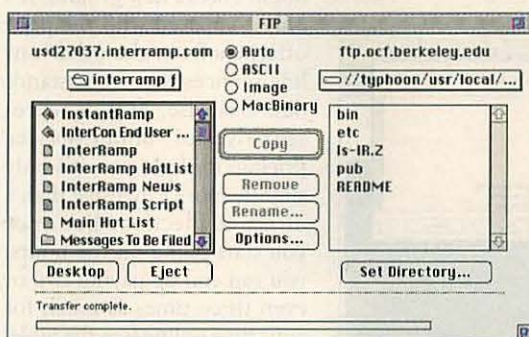
AOL's Internet interface is extremely easy to operate, largely because it uses the service's Mac-friendly native interface. The Usenet newsgroups area resembles AOL's own forum messaging system: lists of topics or articles in movable, resizable windows, which you navigate through labeled buttons or direct double-clicking. You can subscribe to newsgroups by browsing the Usenet hierarchy or, if you know the name of a specific group, by typing that name.

Similarly, the Gopher and FTP interfaces appear simply as extensions of the AOL environment (or you can access Gopher and FTP sites through the AOL Web browser). Like the

graphical FTP and Gopher utilities, AOL handles the petty details of logging on to an FTP or Gopher server—all you do is double-click on an interesting-looking title. The service presents an impressive list of Gopher and FTP sites, and you can search for sites by topic or name. For the pièce de résistance, America Online maintains *mirrors* (FTP sites that replicate the contents of popular servers) for several FTP sites, and shunts mem-

bers to those mirrors, easing the burden on beleaguered Internet hot spots. eWorld's list of FTP sites is brief and odd, although you can search for sites. eWorld relies on its Web browser to provide Gopher access.

Browsing the Web through AOL requires you to concurrently run a browser licensed from InterCon Systems. According to America Online, the AOL software combined with the Web browser will chew up roughly 4.5MB of RAM, which could make life difficult on an 8MB machine with a fat System file (translation: running System 7.5). Some users have reported difficulties installing and using the AOL 2.6 software/browser package—make sure that you have enough RAM and follow AOL's installation instructions carefully. If you encounter problems, try trashing the AOL preference files and checking AOL's help forums for other tips. AOL's Web implementation is not the smoothest—it was appreciably slower than a direct PPP connection. Also, the browser we tested had occasional problems with pages that had forms, and it didn't recognize some of the more advanced Netscape page-design commands (see the screen shots "Ade-



Get Me That File TCP/Connect II's FTP client lets you switch among directories of FTP servers and choose which files to display.



Valet Service Internet Valet offers access to major Internet applications in one place, but you pay for the convenience.

this article was written, online services were generally providing Internet access through tacked-on gateways that made a hash of the Mac interface guidelines and occasionally didn't even resemble the services' own interfaces.

We tested America Online, eWorld, CompuServe, Prodigy, GENie, and Delphi for their E-mail, Usenet newsgroups, FTP, Gopher, and World Wide Web access. We looked for comprehensive access to those Internet functions; consistent, easy-to-understand interfaces; and pointers to relevant sites.

America Online and eWorld: Best Available

The arrival of America Online subscribers on the Internet—and their subsequent violations of good taste and netiquette—is the stuff of legend. But when it comes to online-assisted Internet access for Mac

quote, Not Amazing"). The latter problem is no surprise, as Netscape constantly adds new commands and waits for the rest of the Web world to catch up, but pages designed using the latest commands won't look quite right to AOL surfers. One nice feature of AOL's browser is that users can maintain multiple *hot lists* (address books of Internet sites that you want to revisit). You have to first add an address to the main list; then you can drag and drop or cut and paste it to another hot list. For those with a more creative bent, America Online will offer 2MB of space per user for personal Web pages. eWorld's Web implementation is nearly identical to AOL's, except that eWorld doesn't offer free home pages.

On America Online, you can send and receive as much E-mail as you want, the

message size limits are generous, and E-mail doesn't cost extra. eWorld adds primitive but useful rules-based mail processing to the basic AOL package. One big complaint: none of the commercial services, America Online and eWorld included, support attaching files to electronic messages going over the Internet. So from America Online, you can only send an attached file to another AOL member, but not to your mom if she uses CompuServe. (For tips on software that will help you get around this and other online-service problems, see *The Desktop Critic*, this issue.) In general, America Online's E-mail package is solid but not spectacular.

In fact, "solid but not spectacular" describes America Online's total Internet presentation. The service is useful but doesn't break new ground. It's only compared with the poor offerings from the other online services that AOL stands out. Costwise, AOL is representative of online-service pricing: for light use, it's only slightly more expensive than a direct connection. But once you start piling on the hours, you can end up paying two or even three times as much for your time online (see the table, "How Much Do Online Services Charge for Internet Access?"). America Online, like most services, offers a free trial period. Take advantage of these deals while investigating your other options.

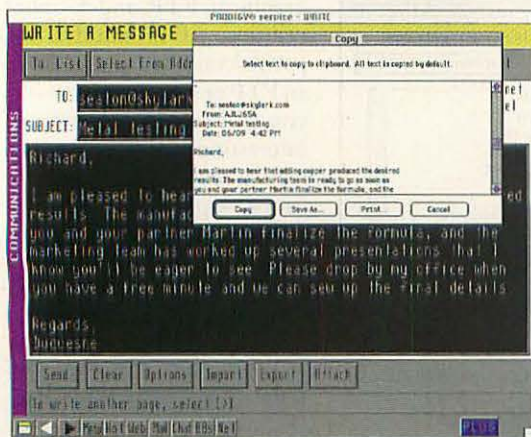
CompuServe and Prodigy: Rough Riding

CompuServe and Prodigy are both relatively inexpensive services, but when it comes to their interfaces, you get what you pay for.

CompuServe's graphic Usenet news reader is functional at best, and the rigidity of the interface offsets the benefits of the few advanced features. (The news reader requires CompuServe Information Manager [CIM] 2.4.2, the service's front-end application.) You can easily subscribe to newsgroups by browsing or by providing the name, but once in a Usenet area, you can't resize or switch between windows. For instance, while crafting a message, you can't open other newsgroup posts (called articles) to refer to. On an etiquette note, the Usenet posting window makes cross-posting to multiple newsgroups (regarded in most cases as rude behavior) as easy as clicking on a few check boxes.

Prodigy's Usenet implementation is as bad or worse. As with CompuServe, you can't resize any of the windows; and many functions, such as copy and paste, are only occasionally available, and then only by clicking on a button, not by pulling down a menu. The one nice touch with Prodigy is that when you enter a newsgroup thread (a series of messages related to a single topic), the software opens a window with two scrollable text boxes, one above the other. The top box displays a list of messages in the thread, while the lower box contains the current article's text.

CompuServe has modified its for-



Messaging Gone Amiss Cutting and pasting while composing E-mail on Prodigy is a chore that requires the use of an irritating intermediary window.

How Much Do Online Services Charge for Internet Access?

The costs of using an online service to get to the Internet can add up quickly. While individual usage patterns vary, we picked three hypothetical scenarios (light, moderate, and heavy use) to give you an idea of the cost.

Based on a 9.6-Kbps connection during off-peak hours, *light use* estimates usage at 10 hours per month with 10 E-mail messages. Also based on a 9.6-Kbps connection, *moderate use* includes 25 hours (15 off-peak and 10 peak) and 50 messages. *Heavy use* is based on connecting at 14.4 Kbps for 50 hours (30 off-

peak and 20 peak) with 100 E-mail messages. (We assumed that messages were no longer than 7500 characters.)

Estimate what your usage will be and figure out the cost based on each service's pricing structure. Keep in mind that if you're serious about using the Internet, a direct connection through an Internet service provider will most likely be a more cost-effective option than an online service. However, an online service may offer other advantages, such as an easy-to-use interface.

Company	Phone	Web Site Address	Monthly Fee/ Hours Included ^A	Cost per Extra Hour	Light Use Monthly Cost	Moderate Use Monthly Cost	Heavy Use Monthly Cost
America Online	703/448-8700; 800/827-6364	http://www.blue.aol.com	\$9.95/5	\$2.95	\$24.70	\$68.95	\$142.70
CompuServe	614/457-8600; 800/524-3388	http://www.compuserve.com	\$9.95/5	\$2.95	\$24.70	\$68.95	\$142.70
			\$24.95/20	\$1.95	\$24.95	\$34.70	\$84.45
Delphi	617/491-3342; 800/695-4005	http://www.delphi.com	\$10/4 ^B	\$4.00 ^B	\$34.00	\$184.00	\$374.00
			\$30/30 ^B	\$1.80 ^B	\$30.00	\$120.00	\$246.00
eWorld	408/974-1236; 800/775-4556	http://www.eworld.com	\$8.95/4	\$2.95	\$26.65	\$70.90	\$144.65
Genie	301/340-5216; 800/638-9636	http://www.genie.com	\$8.95/4 ^C	\$3.00	\$26.95	\$91.95	\$186.95
Prodigy	914/448-8000; 800/776-3449	http://www.prodigy.com	\$9.95/5	\$2.95	\$24.70	\$68.95	\$142.70
			\$29.95/30	\$2.95	\$29.95	\$29.95	\$88.95

^A Prices for contiguous continental United States. ^B At peak hours (6 a.m. to 6 p.m. weekdays) there's an additional \$9-per-hour charge for connecting to Sprintnet and Tymnet. ^C Monthly fee includes four nonpeak hours (a \$12 credit). At peak hours (8 a.m. to 6 p.m. weekdays) there's an additional \$2-per-hour charge.

merly medieval attitude toward E-mail: it no longer charges by the character for messages. The service's mail-creation software is competent but unremarkable.

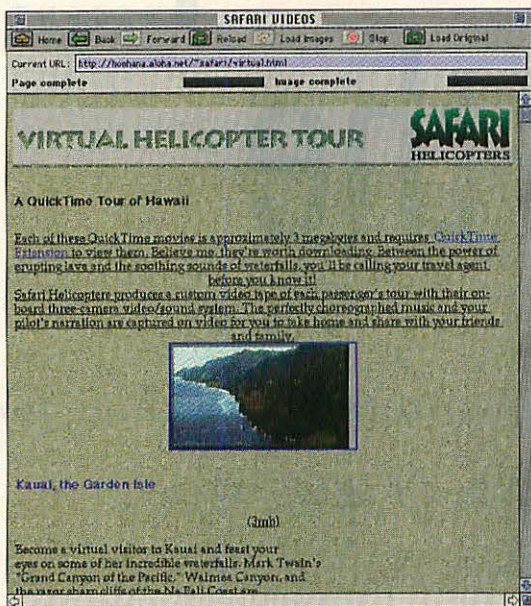
Composing E-mail on Prodigy, on the other hand, is a nightmare: instead of using a text box with a scroll bar, you must construct a message in single-screen increments. You cannot cut and paste text directly in the message-construction screen; when you select Copy, the software copies your entire message to an intermediary window, where you select the text that you want to copy to a clipboard (see the screen shot "Messaging Gone Amiss").

CompuServe's implementation of FTP is clunky. Like eWorld, the service offers some sites to start with, but the list is short. The software automates the login process to a degree, but it's nowhere near as seamless as on AOL or eWorld. Once you're logged in to a site, you navigate a Windows-style file menu, with directories and subdirectories on the left and file lists on the right. CompuServe is one of the few services to support Telnet, with which you can log in to remote servers over the Internet.

CompuServe's supposed Web solution requires a PPP connection and TCP/IP software, as if CompuServe were an ordinary ISP. You have to get MacTCP, download MacPPP and any applications you want to use, and then cobble the whole mess together. CompuServe says that it will have a configuration utility by the end of this summer.

CompuServe has announced that Mac CIM 3.0, due at the end of 1995, will have an improved interface and an integrated Web browser. CompuServe says it will introduce an entry-level consumer service in 1996 that will have more limited services, but be easier to use.

Prodigy relies on its Web browser to provide Gopher, FTP, and Web access, and it's done a nice job on the Windows side. The company says it will release a new Mac client, complete with a Web browser, in late 1995. Also, Prodigy gives each member 200K to create a Web page.



Adequate, Not Amazing America Online's browser is on the slow side and occasionally has trouble with pages using more



advanced HTML formatting (left)—compare the same page viewed on Netscape Navigator (right).

GEIE and Delphi: Text Ahoy

When this article was written, there wasn't much point in a Macintosh owner's trying to wring Internet functions out of either of these text-based services. Both GEIE and Delphi support E-mail, Usenet newsgroups, FTP, and Gopher. Delphi gives users access to the Web through a Unix text-based interpreter called Lynx, but surfing the Web with Lynx is like reading the screenplay for *Star Wars*—you get the idea, but something important is missing. One plus: these services are easy to automate with scriptable terminal-emulation software, and there are several front-end applications that can log on during off-peak hours and download newsgroup articles and E-mail. GEIE, which has been working on a graphical Mac client for at least a year, says it will release one late this year. Delphi, which has offered Internet connectivity for some time, says that it will relaunch in the fall as a graphically oriented service based on Internet protocols, and that a Mac client will be available by the end of 1995.

The Last Word

Getting to the Internet involves establishing a direct connection through an Internet service provider, using an online service, or combining these methods in a way that makes sense for you.

With a commercial online service, you pay for professionals to do most of the work for you; while this route is more convenient, it's less flexible, and most services still don't have their Mac act together. However, we recommend this strategy as a good starting point, with one

caveat: use America Online and take advantage of its free trial period.

More serious users should invest in a SLIP or, preferably, a PPP account. While launching and sustaining this kind of direct connection involves hacking through an underbrush of cryptic networking terms and complex addressing schemes, you get more options and the satisfaction of independent exploration. If you go this route, in addition to getting Adam Engst's Internet book, we recommend checking out the newsgroup **comp.sys.mac.comm**. The FAQ (frequently asked questions) file for this group is available at <ftp://ftp.sunet.se/pub/mac/umich/misc/documentation/>. You'll find other resources at <http://www.charm.net/pip.html> and <http://www.brandonu.ca/~ennsnr/Resources/Welcome.html>.

Connecting to the Internet can be a fairly smooth journey or terribly treacherous, but it will be a rewarding trek. Whether you strike out on your own or hire guides to take you there, your hard work will pay off when you're connected and begin to discover the informational riches of the Net—when you, like Stanley, step into the clearing and greet your elusive target with an ice-cool, martini-dry, "Dr. Livingstone, I presume." **m**

Next month: Macworld's "Internet Essentials" special report shows you how to build your own home page and protect your E-mail.

Macworld associate editor CAMERON CROTTY has been telecommunicating since the 300-bps modem was gee-whiz technology. Assistant editor JOANNA PEARLSTEIN learned to use the Internet on a VAX system and doesn't miss Unix one bit.

Pick the Best *Macworld tests the tools for exploring the World Wide Web* Browser

The World Wide Web, the graphical, hypertext section of the Internet, has become the electronic equivalent of a Turkish bazaar: there's so much to explore in this fast-paced, colorful, exhilarating new marketplace, you hardly know where to turn next. That's why you need an efficient, feature-rich, easy-to-use Web browser. You can access information on the Web without

one, but only a browser will let you see the full range of images and colors available on the Web. A browser interprets HTML (HyperText Markup Language) code, the Web's standard formatting language, to display a Web document (often called a *page*) on your screen. A browser supports many different network protocols and services, such as HTTP (HyperText Transfer Protocol), FTP (File Transfer Protocol), Telnet, Gopher, SMTP (Simple Mail Transfer Protocol), and NNTP (Network News Transfer Protocol), and massages them into what looks like a single, seamless whole.

There are now five Web browsers for the Mac: Mosaic, from NCSA (National Center for Supercomputing Applications); Enhanced Mosaic, from Spyglass; Netscape Navigator, from Netscape

Communications; MacWeb, from Enterprise Integration Network (EINet); and TCP/Connect II, from InterCon Systems. All perform the basic task of displaying HTML-formatted documents. Beyond that, browsers vary in form and function. Some act as a complete interface to the Internet; others offer little beyond graphical access to Web sites.

I evaluated the five browsers to see which one combines the best array of tools with top performance and flexibility. (Many leading Mac communications programs include some Internet tools but not Web browsers. I've reviewed only those communications programs that support HTTP, the Web protocol.)

I tested each browser's support for network protocols and services by setting up my own page with links to a variety of test servers—FTP, NNTP, E-mail, terminal emulation, and Gopher. (You can test that page yourself; the address is <http://www.opus1.com/www/demo.html>.) In addition, I considered how each browser handles GIF (Graphics Interchange

plans to release its own version, called Mosaic In A Box, late this year.

Perhaps because it's been around longer than other browsers, NCSA Mosaic is in some ways more advanced than its competitors. For example, it allows you to annotate any HTML page with text or audio. If you're using the Web as it was intended—for research—these annotations can reflect your notes and comments on documents. NCSA Mosaic also fully supports both types of standard firewall systems (proxy servers and secure sockets gateways), which lets you operate a browser with optimal security. There's also a kiosk mode, which gives Mosaic the same kind of look and feel as an interactive information kiosk, the kind you find in airports and shopping malls. NCSA Mosaic has the most detailed configuration system as well, giving the user a lot of control over fonts and sizes when displaying documents (see the screen shot "Mosaic Styles").

NCSA Mosaic's on-disk cache keeps recently used documents available, a great way to reduce needless network traffic. If you visit a home page that has already



Browser Tools Web browsers typically offer icons that help you quickly perform a variety of tasks. InterCon's TCP/Connect II menu bar has the largest array of icons—20 in all, including a variety of Internet-related icons: begin a new online session, transfer a file, start a news session (via the newspaper icon), begin a Gopher session, launch the Web browser (the icon that looks like a spiderweb), check for E-mail, subscribe to or unsubscribe from newsgroups, and open your Web hot list.

been loaded into the cache, for instance, Mosaic simply reads it from your hard drive instead of transmitting it all over again. Mosaic makes the network seem faster by displaying parts of pages as they are transmitted, rather than waiting for the whole page to arrive before showing anything. Mosaic also lets you skip an incoming page before it has been completely drawn on screen; that way, if a page doesn't interest you, you can just move on to the next one.

Because the latest version of Mosaic is still considered beta software, I expected some glitches—and found them. NCSA Mosaic crashed more than any other browser. Some crashes, such as those I encountered with my news server tests, were consistent—every attempt to read news with Mosaic left me reaching for the Mac's restart button. Mosaic couldn't communicate with my test FTP server either, insisting that there were no files to be found on it. Also, NCSA Mosaic has no formal tech support; if you need commercial-quality software, NCSA points you to Spyglass's Enhanced Mosaic (more on that later).

Requiring a helper application for audio files is one thing, but NCSA Mosaic relies on a helper application to display the stand-alone GIF and JPEG files that are simply linked to the page (NCSA Mosaic can display GIF and JPEG files that are part of the page's design). Stand-alone GIF and JPEG files are so common that NCSA Mosaic's inability to display them is irksome. NCSA offers several good freeware and shareware helper applications for viewing GIF and JPEG files, but you lose some of the seamlessness of the Web when you have to switch between applications. Helper applications can also consume memory at a prodigious rate.

Mosaic was once the top browser, but the current version has more bugs than the Florida Everglades and just doesn't offer a competitive suite of features. True, it's free, but in Mosaic's case, it's not worth the money.

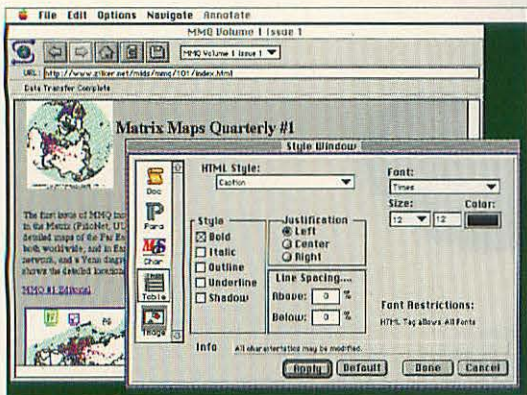
Enhanced Mosaic

NCSA made an agreement with Spyglass, in which Spyglass would create a commercial version of the browser, called Enhanced Mosaic. Spyglass doesn't sell directly—unless you want to buy 10,000 copies or more. Instead, it packages customized versions of Mosaic and licenses them to other Web-browser developers. To date, more than 27 companies have licensed Enhanced Mosaic from Spyglass. Rather than review them all, I looked at a representative sampling from licensees Ventana Media (919/942-0220; <http://www.vmedia.com/>); Digital Equipment Corporation (DEC, 508/493-5111; <http://www.digital.com/>); and O'Reilly & Associates (707/829-0515; <http://gnn.com>).

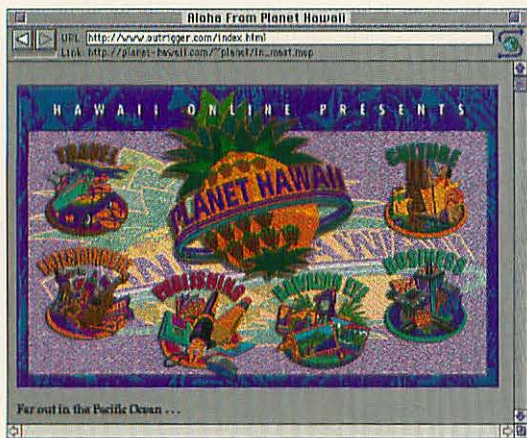
Although Spyglass modifies Mosaic's interface for each licensee, the product (based on version 1 of NCSA Mosaic) is essentially identical in functionality no matter whom you get it from. But Enhanced Mosaic is always sold as part of a bundle or package, and so pricing varies. O'Reilly, for example, charges \$29.95 for its book *The Mosaic Handbook for Macintosh*, which includes Enhanced Mosaic. Ventana bundles its version with the \$29.95 book *Internet Roadside Attractions*. But another Ventana book, *The Internet Membership Kit*, which includes Enhanced Mosaic along with other software tools, retails for \$69.95. And DEC's LAN operating system bundle, Pathworks for Macintosh, costs \$371 (for one user license and other costs) and includes Mosaic.

Spyglass has significantly helped establish the stability of Enhanced Mosaic. Although NCSA Mosaic crashed when I tried connecting to the news server, Enhanced Mosaic handled the connection without fault. In fact, Enhanced Mosaic crashed only once, as it attempted to display a hypertext document with several dozen embedded color graphics.

But Web browsers cannot survive on stability alone, and Enhanced Mosaic falls short on features. The interface is exceedingly spartan; there are only 2 icons—left and right arrow controls—for handling navigation or tools, compared with NCSA Mosaic's 5 and TCP/Connect II's 20. Enhanced Mosaic can't display



Mosaic Styles NCSA's Mosaic browser lets you easily tailor a home page's font styles (switching from roman to boldface, left to right-justification, and so on) for your monitor.



Enhanced Mosaic: Paradise Lost Unlike Mosaic, the many versions of Enhanced Mosaic offer no navigational icons or tool bars beyond the left and right arrow controls (top left of the screen).

embedded JPEG graphics and depends on helper applications to download and display stand-alone GIF and JPEG files. It can't send E-mail, and the versions I looked at couldn't connect to my test FTP server or configure the set of helper applications. What's more, Enhanced Mosaic has no on-disk cache, and you have to wait for an entire hypertext document to be transmitted before you can view any part of it.

I'm disappointed in the lack of progress Spyglass has made since the original release of NCSA Mosaic. Spyglass may be making Mosaic crash-free, but it has done little to expand or improve the product's original features.

MacWeb

EINet's MacWeb 1.00A3.2 is by far the fastest of the Web browsers I evaluated. Its news reader is blindingly fast compared with Netscape Navigator's, and its file transfers were also snappy. For example, Netscape took 41 seconds to load a list of newsgroup titles that MacWeb handled in 7 seconds. (MacWeb is available for downloading, at no cost, at <ftp://ftp.einet.net/einet/mac/macweb/macweb.latest.sea.hqx>.)

A couple of years ago, MacWeb was the most advanced browser for the Mac. Since then, MacWeb has been under permanent construction and has lagged far behind the other browsers. It has no on-disk cache, it doesn't support embedded JPEG graphics, there's no firewall support, you can't send E-mail, and it couldn't talk to my FTP server.

EINet has developed other Web products but hasn't done much in the browser area. The company's recent acquisition by SunRiver could rekindle EINet's interest in browsers.

TCP/Connect II

InterCon's TCP/Connect II 2.1.2 is a full-featured communications package for the Mac. Since TCP/Connect II already includes terminal emulation, electronic mail, news readers, Gopher clients, FTP clients, and other Internet client software, it made sense for the InterCon developers to build a Web browser that could be tightly integrated into the company's existing offerings.

You can download an evaluation version of TCP/Connect II at <http://www.intercon.com/download.html>. InterCon sells the full version of TCP/Connect II for a suggested retail price of \$495; a remote version offering only dial-up modem access over SLIP or PPP networks retails for \$195. By the time you read this, InterCon (713/709-5500) should be selling its Web browser as a

stand-alone product for \$29.95. (The company was recently acquired by Performance Systems International but will operate as a wholly owned subsidiary and maintain its own corporate identity.)

While the other browsers depend on helper applications to perform some functions, TCP/Connect II does it all in a single application. In some ways, this is an ideal strategy. For example, a single application saves a lot of memory: TCP/Connect II can operate within about 4MB of RAM, while the other browsers, combined with their helper applications, can bloat to 8MB or more. In addition, TCP/Connect has a built-in Multipurpose

Similarly, TCP/Connect's sophisticated clients for FTP, Gopher, news, and terminal emulation (both ANSI/VT100 and IBM 327X mode) do a better job than most of the helper applications or built-in software in other browsers. For example, with TCP/Connect's FTP client, you can easily download whole directories of files. TCP/Connect II also includes other useful tools: a spelling checker, an FTP server, a Finger client and server, name lookup using the Ph protocol (for looking people up in directories), DNS (Domain Name System) and Whois clients (people, networks, and organizations on the Internet NIC directory), plus a TCP/IP Ping program.

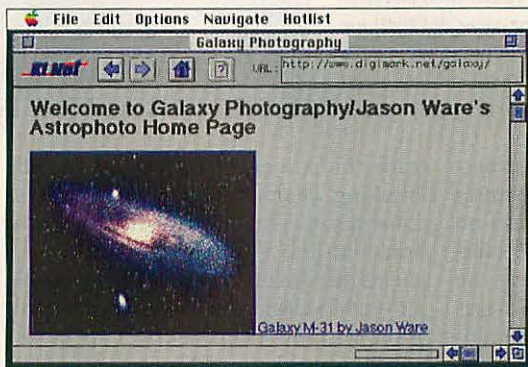
But in other ways, it might be a good idea for TCP/Connect to rely on shareware helper applications. The program's audio file player sounds awful, distorting the samples I downloaded, and it has no options for manipulating or changing the way sounds are played. More important, TCP/Connect II can't be configured to call other helper applications. As a result, TCP/Connect users will have to be in constant communication with InterCon to obtain the latest versions of helper applications. A better long-term strategy would let TCP/Connect jump to helper applications when necessary. TCP/Connect could also be greatly enhanced by an on-disk cache.

TCP/Connect II has some rough spots. The link from Web documents to InterCon's built-in news reader is incomplete, so you can't automatically jump between them. TCP/Connect lost changes to my configuration on several occasions and had other minor, transient bugs. It also managed to crash my Mac once while reading news.

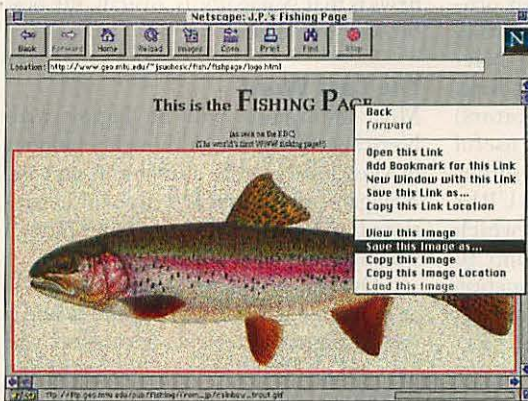
TCP/Connect II has a lot of promise. If InterCon can get the bugs worked out, improve the transition between the browser and other parts of the program, and keep up with the competition in new features, TCP/Connect would be the TCP/IP desktop application of choice.

Netscape Navigator

The original Mosaic developers were quick to perceive the Web's commercial potential; they left NCSA to form Netscape Communications and release a browser of their own. Netscape's pro-

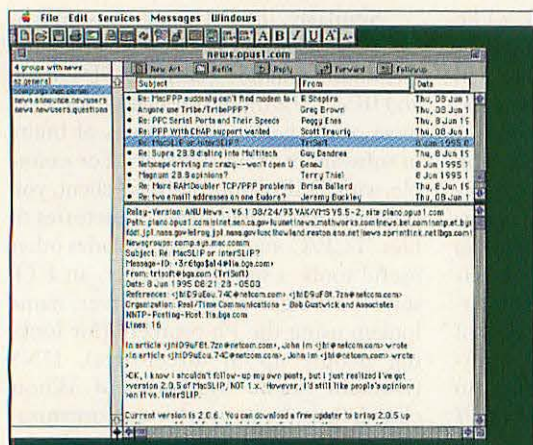


MacWeb Lite With just four icons, MacWeb's interface is sparse. But anyone with a small monitor will appreciate MacWeb's scaled-down page display.

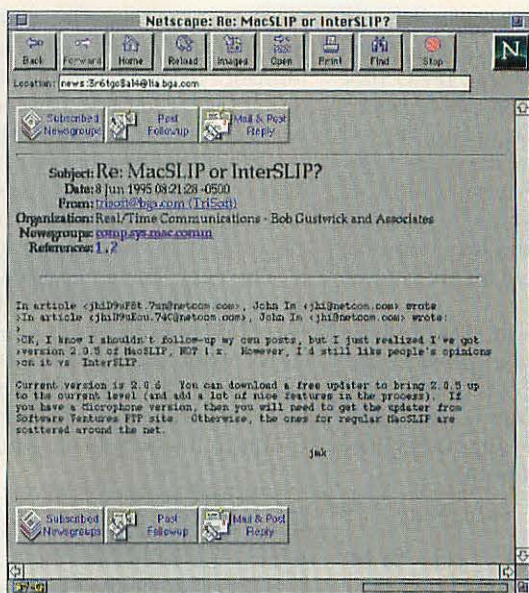


Hooked on Navigator One of Netscape Navigator's many ease-of-use features lets you hold down the mouse button for shortcut, pop-up menus.

Internet Mail Extensions (MIME)—compliant E-mail system; MIME makes it easy to send binary attachments, such as word processor documents and spreadsheets, across the Internet without having them scrambled in the process. And TCP/Connect's mail features give you options far beyond those of any other browser. For one thing, you can read and send mail in the same place. Most browsers include a mail sender as an afterthought, a quick way to let someone else know about a nifty document you've discovered on the Web.



News Worthy TCP/Connect II's news reader (left) places all you need to know on one screen, a real time-saver. But Netscape Navigator's news reader (right) is visually more attractive, and the linking of a news article to previous articles (notice the hot-linked References tool, toward the top of the screen) is a handy feature.



grammers were shameless in constructing Navigator, blending the best features of every other browser they could find into a single product. The result: Netscape Navigator is almost everything you want an Internet browser to be. (Navigator costs \$39; contact Netscape Communications at 415/528-2555 or <http://home.netscape.com/>.)

Navigator was the only browser to pass all my tests without crashing. Its news reader isn't sophisticated but provides a simple interface for integrating news with other Internet browsing. Navigator also reliably seeks and hot-links URLs (Uniform Resource Locators) embedded in news articles—a useful touch that the other browsers either ignore or do poorly. (Hot-linked URLs are links built into documents, which when selected allow you to jump to another document or perform a function immediately.) Navigator handled my test documents well, displaying both JPEG and GIF files without the help of outside applications.

Navigator was one of only two browsers (TCP/Connect II was the other) that could handle the test FTP server, and Navigator supports both proxy server and secure sockets firewall systems. Navigator also has a number of small interface features that make it easy to use. For example, you don't need to memorize arcane keyboard commands for such tasks as saving a copy of an image to disk—simply hold down the mouse button for a few seconds to get a menu of options.

Netscape has used the enormous success of Navigator to push its own extensions to the HTML standard. Enthusiastic Web-page authors now call their creations "Netscape-enhanced" as they build nonstandard HTML documents

with animations, backgrounds, and the blinking characters that Navigator is known for. This practice has begun to fragment the Web; increasingly, documents are designed to be fully accessible through Navigator but are barely intelligible with other browsers. This means you'll probably need Navigator no matter what, if only to make sure you can browse all the documents you come across. That's the bad news; the good news is that Navigator is, overall, the best browser available.

The Last Word

Most Internauts will be happy with Netscape Navigator. Although a number of Web browsers are available at no cost, Navigator costs only \$39 (free for educational and nonprofit users) and is well worth the price.

Overall, Navigator is a stable browser with an excellent set of features and a well-designed interface. Mac users will have no problem learning Navigator and becoming comfortable with it. Navigator can also be combined with inexpensive or free software, such as Qualcomm's Eudora Light mail application and the NCSA Telnet terminal emulator, to build a well-rounded suite of Internet utilities.

If you do a lot of TCP/IP networking, including terminal emulation and electronic mail, you should consider InterCon's TCP/Connect II as an alternative to Navigator. The price is significantly higher, but you get a lot more features for the money. Because TCP/Connect II combines full-featured client packages with a Web browser, one program can handle all your needs; so rather than making you constantly switch between applications, TCP/Connect keeps it all at your fingertips. If InterCon smooths out the

bumps in TCP/Connect II, it could be the best all-in-one package for TCP/IP network users.

Netscape Navigator is also a good choice for mixed-platform environments, as its interface is nearly identical on Macintoshes, Windows PCs, and X-Windows workstations. InterCon markets a Windows version of TCP/Connect II, but the Windows interface is completely different from the Mac product's.

Because Netscape is a Web-focused company, you can expect it to constantly improve its product. However, there are lots of folks on the Web who want to make sure that Netscape doesn't turn into the Microsoft of the Internet. The rivalry between Netscape and other Internet application developers has resulted in the fast-paced introduction of some exciting products. Let's hope they keep it up. **m**

Next month: Macworld's "Internet Essentials" special report shows you how to build your own home page and protect your E-mail.

JOEL SNYDER (jms@opus1.com) is a senior partner with Opus One, specializing in telecommunications and information technology.

At press time, International Data Group, Macworld's parent corporation, purchased a \$2 million stake in Netscape Communications.

Web Browsers



Macworld evaluated five World Wide Web browsers on the basis of support for network protocols and services, ability to handle common graphics files, firewall configuration, interface, speed, and stability.

Netscape Navigator The only browser to pass all the tests without crashing, Navigator is inexpensive, it's easy to use, and it offers full firewall security and a host of other features. **Company:** Netscape Communications. **List price:** \$39.

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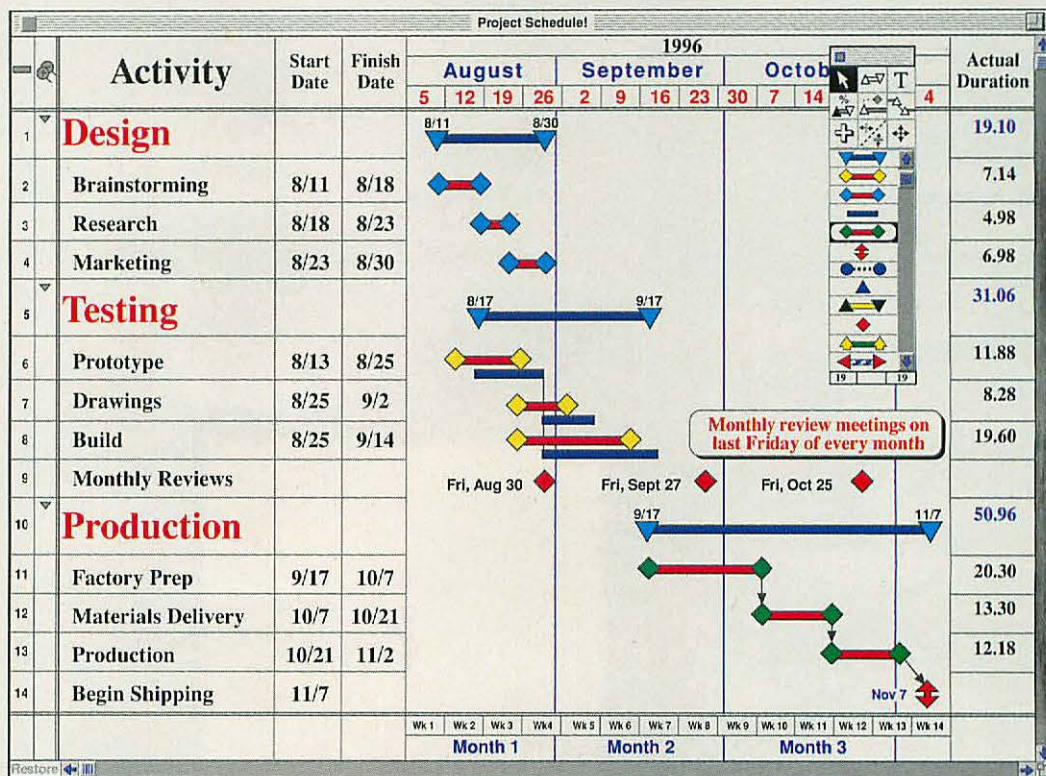
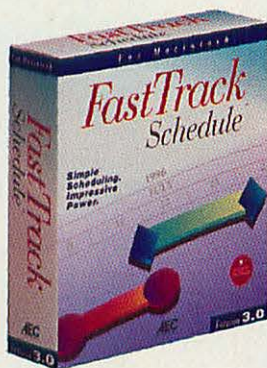
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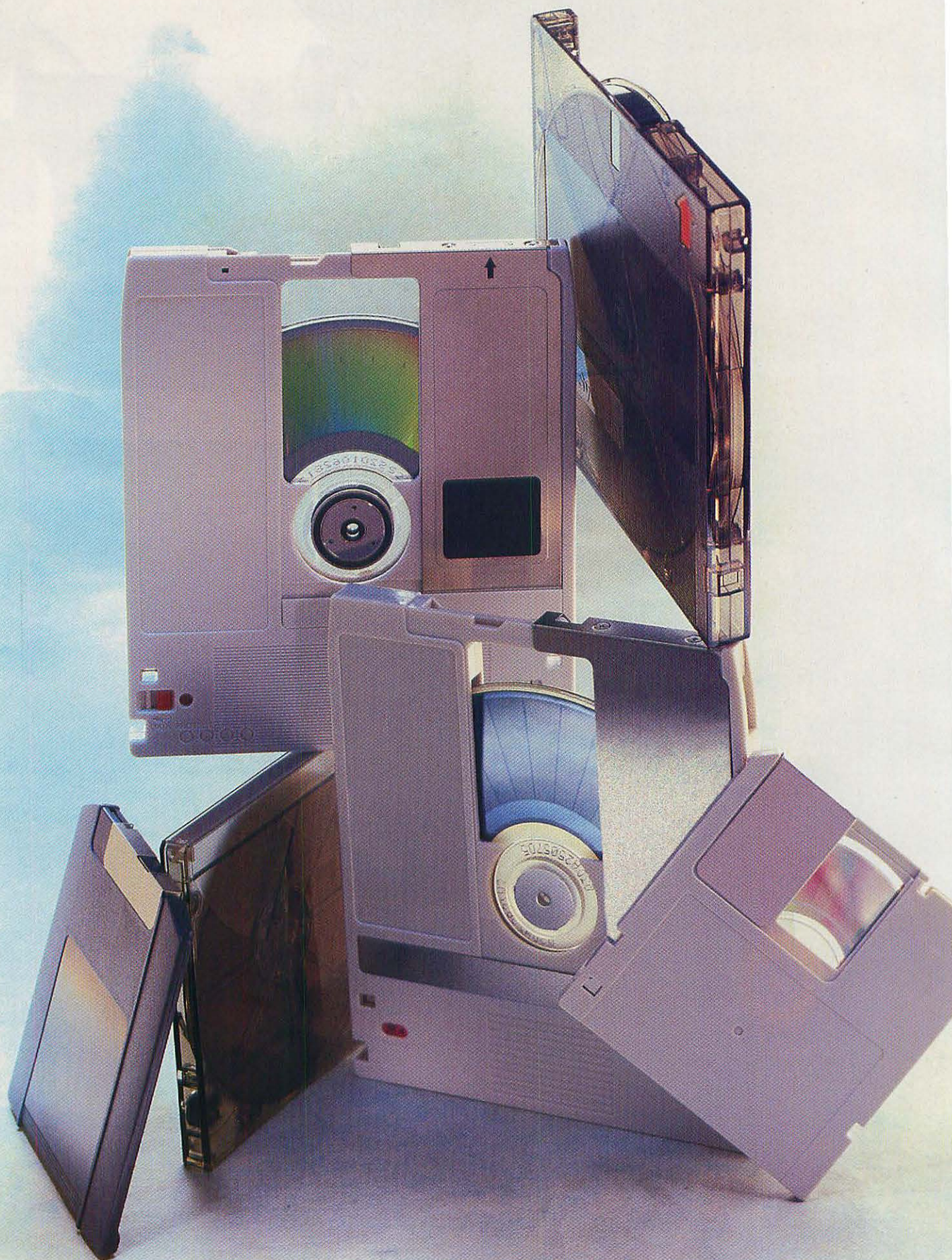
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For many of us, moving lots of data from place to place has become a way of life. If you've got a large DTP job for publication, or a multimedia presentation to be pressed into a CD-ROM, you need some way to transport your masterpiece from your computer to the service bureau's. Or perhaps you telecommute, and move large files between your office and home twice a week, or you want the same start-up volume at both sites. Maybe you're a consultant who needs to bring a full set of digital tools, such as custom software applications, to each client's job site. Almost anything beyond the tiniest data-transport needs generates more information than will fit on a floppy. You need portable storage.

Not to worry; a quick count shows upwards of 15 different portable storage formats and options from dozens of vendors (see the table "Portable-Storage Spectrum"), with more on the way. But which product in this ponderous range of choices fits your needs? Macworld Lab looked at removable disks and drives with an eye toward cost, ease of portability, suitability to task, compatibility, and performance. Our findings should help you solve the portable-storage dilemma.

Portable storage includes traditional removable media such as SyQuest, Bernoulli, optical disks, and removable Winchester hard drives, as well as up-and-coming devices such as Iomega's inexpensive new Zip drives and transportable docking hard drives like the La Cie Joule and MicroNet DataDock systems. (We restricted our analysis to random-access, rewritable media; we didn't include any tape drives or write-once formats such as WORM and CD-Recordable [CD-R], although both of these technologies work well for archiving, and CD-R makes an excellent data-distribution medium. For an overview of backup to tape, see the feature "Successful Workgroup Backup," *Macworld*, May 1995.)

The Hard Drive Edge

As a point of reference for evaluating the various portable-storage formats, first consider traditional hard drive technology. Hard drives use one or more rigid platters with read-write heads on both sides of each platter. Data-transfer rates typically run 2.5MB to 4MB per second, with average



access times (the time it takes the read-write head to move across one-third of the platter's surface, stop, and start reading data) hovering around 15 milliseconds. Each drive is an airtight unit.

A complete hard drive—which is typically reliable and durable and guarantees compatibility with any Mac—is your best shot of ensuring that you can retrieve your data, wherever you go. Small, transportable hard drives are readily available—some are as small as a paperback book. While not quite shirt-pocketable, these drives easily fit in a standard briefcase. You may need to bring two different SCSI cables (and an HD-30 adapter, if you need to connect to a PowerBook) and a power cord, but barring the rare disaster, your data will always be usable.

A removable hard drive system such as the MegaDrive Mercury, tested for this article, mounts a standard hard drive in a special case that inserts into a docking bay. The case includes shock absorption for added security on the go, and special connectors make it *hot pluggable*—allowing removal from the docking bay without powering down the computer.

MicroNet's DataDock and La Cie's Joule transportable hard drive systems also mount drives in special bays, but are not hot pluggable, lowering the cost of the bay. Such systems make sense if you need top capacity and performance, with a reasonably portable system. Telecommuters who move their total computing environment between work and home would find a system of this type appealing. And where all the data is highly confidential, these drives can be removed and locked in a safe conveniently.

The Joule and DataDock systems also support stacking a variety of storage devices, such as tape, magneto-optical (MO), CD-ROM, and SyQuest drives; if your portability needs are particularly

complex, these two systems minimize the cabling, power-supply, and SCSI-chain complications of stand-alone systems.

Since docking systems use mechanisms identical to those in standard hard drives, they deliver hard drive performance. For editing online video or large Adobe Photoshop files, a docking system (removable or transportable) is the best choice. Bear in mind, however, that removable hard drive systems are relatively costly, and for most people, less expensive cartridge-based systems offer similar benefits (see the chart "Cost versus Capacity: Finding the Sweet Spot").

SyQuest Speeds Along

SyQuest drives, available from a wide range of vendors, come in 88MB, 105MB, 200MB, and 270MB capacities. The 105MB and 270MB drives use 3.5-inch disks; the others use a 5.25-inch format. SyQuest technology consists of rigid platters (nearly identical to those in a hard drive) installed in cartridges.

Owing to these similarities with standard hard drives, SyQuest drives deliver performance similar to that of hard drives in the same capacity range. Bear in mind that this performance level is still a far cry from that of larger hard drives. But SyQuest drives combine respectable performance—in a pinch, good enough for off-line video editing—with the advantages of removable media (see the benchmark "Comparing Portable Performance"). The larger-capacity SyQuest formats are also a good choice for desktop publishing; they offer both adequate performance and sufficient size for most jobs.

SyQuest can lower the cost of storage, depending on your overall capacity needs and whether you can comfortably fit your typical files on a single cartridge. We surveyed service bureaus and found that almost all support SyQuest cartridges.

Company	Phone
APS Technologies	816/483-6100
Direct Connections	○
DynaTek Automation Systems	416/636-3000
Fujitsu	408/432-6333
FWB	415/325-4392
Hewlett-Packard	○
Iomega	801/778-1000
La Cie	503/520-9000
Liberty Systems	○
MacProducts	512/892-4070
MaxConcept	619/530-9062
Maxoptix	408/954-9700
MegaDrive Systems	310/247-0006
MegaHaus	○
MicroNet Technology	714/453-6100
Microtech International	203/468-6223
Mirror Technologies	612/830-1549
Mitsubishi Chemical America	408/954-8484
Ocean Microsystems	714/898-1340
Olympus Image Systems	○
Optical Access International	617/937-3910
Optima Technology	714/476-0515
Pinnacle Micro	714/789-3000
Plasmon Data Systems	408/956-9400
PLI	510/657-2211
Procom Technologies	714/852-1000
ProMax Technology	714/727-3977
Sony Electronics	408/432-0190
Spin Peripherals	508/787-1200
Supermicro	○

● = yes; ○ = no, none. * Capacity availability varies by vendor.

Optical—Slow but Stable

MO drives combine magnetic and optical hardware and require at least two passes for each write to the glass-based disk. The first pass erases the area about to be used, and the second writes new data. An optional third pass verifies the data. These additional passes, combined with the added mass of optical components in the

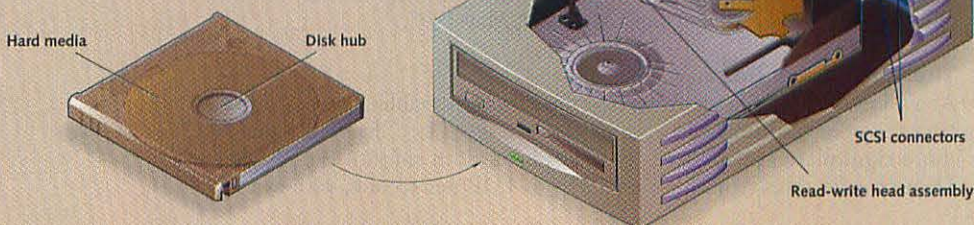
How to Build Cost-Effective Cartridge Drives

Iomega's Zip drive and SyQuest's EZ135 take very different routes to achieve the same goal: removable mass storage at rock-bottom prices.

SyQuest EZ135

SyQuest shrinks and refines its traditional technology in the new EZ135. Unlike those of earlier SyQuest units, the EZ135's drive housing is sealed (except for the disk bay and the control buttons). To further reduce contamination by dust, the disk-bay cover opens only when users insert or remove cartridges. The disk hub improves on earlier designs, with notches that help center the disk on the spindle. The notches improve disk positioning and make it easier for the standard servo read-write head assembly to follow data tracks. The EZ135 will

not accept an incompatible disk, should you accidentally insert one, and the EZ135 improves on the Zip with full-size SCSI connectors and a power switch. SyQuest kept costs down by using single-sided disks.



MECHANISM TYPE

Toll-Free Phone	SyQuest *	Bernoulli	Optical *	Removable Hard Drive	Zip	Included Software **	Warranty (In years)	Toll-Free Technical Support
800/235-2753	●	○	●	○	○	APS Powertools	230MB MO 2; others 1	●
800/572-4305	●	○	●	○	○	Anubis	1	●
800/267-6007	●	○	●	●	○	Compass Pro	5	●
800/626-4686	○	○	●	○	○	○	1	●
○	●	○	●	○	○	Hard Disk ToolKit	SyQuest 2; MO 1	○
800/826-4111	○	○	●	○	○	DiskMaster Plus	1	○
800/777-6654	○	●	○	○	●	Zip Tools	Bernoulli 5; Zip 1	●
800/999-0143	●	○	●	●	○	La Cie Utilities	1	●
800/774-5044	●	●	●	●	○	Hard Drive Toolkit, PowerMerge	2	○
800/347-8739	●	○	●	○	○	○	230MB optical 1; others 2	●
○	●	○	●	●	○	Lido 7, Surf Guard	1-5, based on type	○
800/546-6695	○	○	●	○	○	○	1	●
800/404-6342	○	○	●	●	○	○	2	○
800/786-1184	●	○	●	●	○	SuperSpot	varies based on type	○
800/800-3475	●	○	●	○	○	○	230MB optical 2; others 1	○
800/626-4267	●	○	●	●	○	DiskForce	2	●
800/654-5294	●	○	●	○	○	○	2	●
800/347-5724	○	○	●	○	○	Retrospect	1	●
800/944-6232	○	○	●	○	○	○	1	●
800/347-4027	○	○	●	○	○	○	2	●
800/433-5133	○	○	●	○	○	SuperCache	1	●
○	○	○	●	○	○	○	1	○
800/553-7070	○	○	●	○	○	○	1	●
800/445-9400	○	○	●	○	○	○	1	●
800/288-8754	●	○	●	●	○	SCSI Control	2	●
800/800-8600	●	○	●	○	○	Retrospect (with MO drives)	2	●
800/977-6629	○	○	○	●	●	Lido 7	2	●
800/352-7669	○	○	●	○	○	varies	1	●
800/215-9200	●	●	●	○	○	○	optical 2; others 5	●
800/352-3415	●	●	●	●	●	○	***	○

* All drives include formatting software. *** Not provided by company.

read-write head, slow MO performance to half that of today's hard drives (or less).

A second type of optical technology, called phase change, eliminates the erase pass and the magnets required by MO drives. In phase-change drives (not tested) a high-power laser writes data by altering the reflective qualities of the media, while a weaker laser reads data by deciphering

the variations in reflectivity. Despite elimination of the erase pass and the ability to pack about 15 percent more data on a cartridge, phase-change drives have historically tested out as slightly slower than most MO drives and have captured a much smaller market share.

MO drives come in 128MB, 230MB (each based on 3.5-inch disks), and in

650MB and 1.3GB (5.25-inch disks) capacities. As this article went to press, 5.25-inch, 2.6GB drives were just coming to market. The 230MB drives can be more cost-effective than the SyQuest drives if you need to store more than about 3GB of data. At that point the lower cost of MO media offsets the larger storage capacity of the SyQuest 270MB. A similar shift occurs for the larger 1.3GB MO drives against most other media at around 10GB of data.

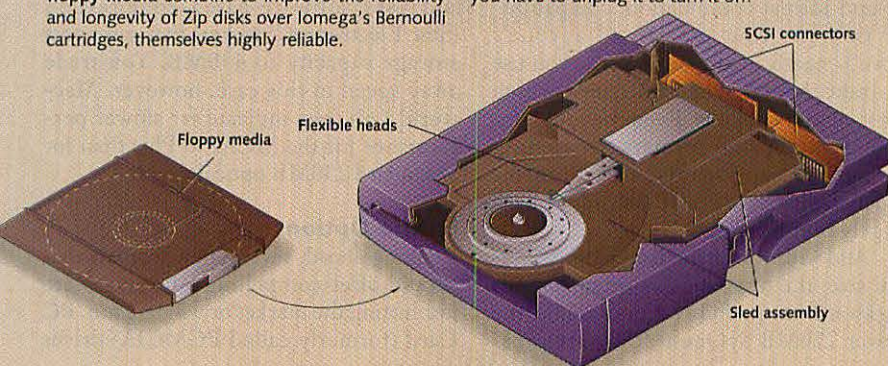
While it may be slightly cheaper to keep 10GB of data on Zip or 230MB MO media, it's much easier to keep track of 8 of the 1.3GB MO cartridges than 44 of the 230MB MO cartridges or 100 of the Zip cartridges. The 1.3GB cartridges are particularly useful in video editing, where you must quickly back up and restore huge files as you move active projects off expensive, fast hard drives or RAID systems.

Another advantage of optical drives is longevity. Optical industry simulations suggest that in the typical office environment, MO media will survive for more than 150 years with no data loss. Whether that data will be of any use in the next cen-

Iomega Zip

Unlike other removable-cartridge devices, the Zip drive uses a **sled assembly** to house the read-write head and hold the disk in position. This setup allows Iomega to use an inexpensive, lightweight, plastic drive case. Iomega says the Zip's **flexible heads** and **floppy media** combine to improve the reliability and longevity of Zip disks over Iomega's Bernoulli cartridges, themselves highly reliable.

But the Zip drive also trades away conveniences to reduce costs. It uses a 25-pin **SCSI connector** that would normally require an extra 25-to-50-pin connector to attach the drive in the middle of a SCSI daisy chain. The Zip also lacks a power switch; you have to unplug it to turn it off.



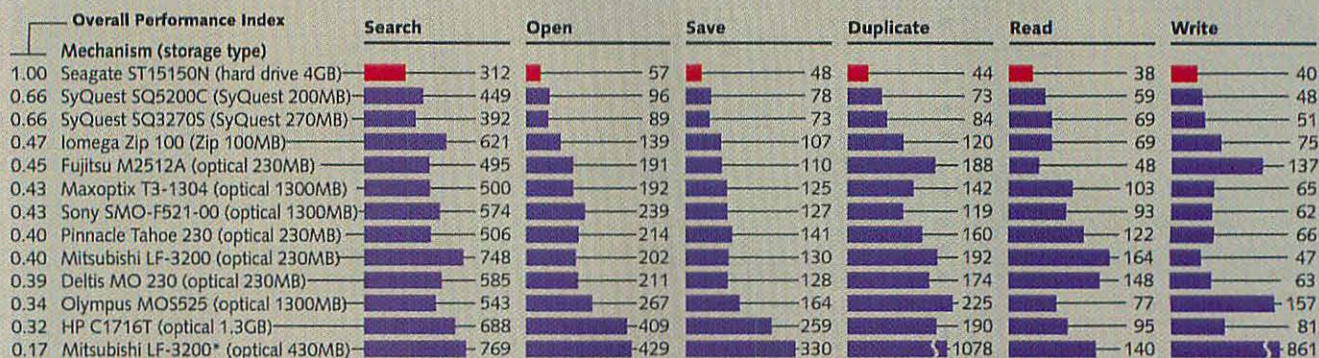


Comparing Portable Performance

In order of overall performance from fastest to slowest. Times are in seconds. Shorter bars are better. = Best result in test.

Although the least portable, removable hard drives (such as the Seagate-based MegaDrive unit, shown below) are by far the fastest. Tasks, such as database lookups, that rely heavily on access and small transfers are particularly difficult for optical drives, while SyQuest and Iomega's Zip drives fit in

between. Slow access time hinders the Zip drive's performance for tasks such as database searches and would make it painfully slow for multimedia tasks, but the Zip fares well in simple transfers. SyQuest offers substantially better overall performance than any of the other cartridge-based technologies.



*Mitsubishi MCA230 Plus with Stacker 2.0 compression.

BEHIND OUR TESTS

Macworld Lab tested the portable drives using standard business and graphics applications. To show the effect of fast access, we ran an unindexed search of a 96,775-record ACI 4th Dimension database. For an indication of data throughput, we opened and saved a 20MB Adobe Photoshop file, with the scratch disk set to the mechanism tested. The

remaining tests indicate general performance when reading and writing files in the Finder. Mechanisms were tested on a Macintosh Centris 650 with 16MB of RAM running Mac OS version 7.5.—Macworld Lab testing supervised by Danny Lee and Tim Warner

tury, or whether there will be any drives still around that can read the cartridges (much less computers that understand the file system and data formatting) is doubtful in the extreme—but this kind of durability makes optical the logical choice for medium- to long-term archiving.

Low-Cost Leader

The Zip drive, a high-density floppy in a hard cartridge, enjoys strong popularity because it's so inexpensive—less than \$200 for the drive, and about \$19 per 100MB disk. The higher data density and faster rotation speed move its performance well beyond its floppy heritage, putting it on a par with the 80MB hard drives found in many older Macs. Zip drives support 3.5-inch media in 20MB and 100MB capacities, but currently only 100MB cartridges are available (and at press time Iomega was scrambling, without success, to meet the demand for both drives and media).

Zip's low cost turns consumers' heads, but its relatively small storage capacity rapidly multiplies the number of cartridges required for graphic design, video production, or a host of other jobs. The Zip's performance also leaves something to be desired—it's substantially slower than SyQuest in all tests. So Zip drives make sense if you have a small amount of data to transport or back up, and if performance is strictly secondary.

SyQuest recently announced a new format that will compete head to head with Zip—the EZ135 drive, based on 135MB, 3.5-inch cartridges. The new SyQuest (which should be available when you read this), with its rigid platters rather than floppy media, should be faster than the Zip drive. At a \$239 list price for the drive with one disk (with an estimated street price of \$199), plus about \$19 per additional disk, the EZ135 should certainly capture many customers who have modest storage needs—particularly if Iomega's difficulty meeting demand continues. Unfortunately, the new SyQuest is not compatible with the older 105MB and 270MB 3.5-inch SyQuest drives.

Compatibility Questions

Without adequate compatibility between drives, portable storage can be a nightmare. Fortunately, within each technology-and-format combination, compatibility between your media and anyone's drive is nearly assured as long as you use an industry-standard format—which most vendors include. Even the problems with many optical formats (frustrating enough to tempt many a user to throw expensive hardware out the window) have largely been eliminated.

And within each media type and physical size, the drive makers often support backward compatibility. For example, the newer 270MB SyQuest drives are capa-

ble of reading the 105MB, 3.5-inch SyQuest cartridges. The 230MB MO drives can read the older 128MB MO cartridges, and the newer 1.3GB MO drives can read the older 650MB MO cartridges.

But cross-compatibility is far from universal, even among like drives. Docking systems (such as La Cie's Joule and MicroNet's DataDock) are completely incompatible—with no change in sight. With cartridge-based storage, problems most often occur when a vendor deviates from the standards to differentiate its product. Ocean Microsystems, for example, sells a 3.5-inch MO format that squeezes more data on a disk (up to a total of 348MB), but other 3.5-inch MO drives cannot read this Ocean format.

Mitsubishi Chemical was able to get around this problem with its MCA230 Plus MO drive. That drive reads and writes to standard 230MB MO cartridges and uses software-based compression (Stac Electronics' Stacker) that can boost storage capacity to 430MB. You trade away speed in this case, however. Macworld Lab tests indicate far slower performance for the MCA230 Plus than for a standard 230MB optical drive.

Future Options

Looking ahead, several new formats that should offer compelling advantages are just hitting the market or will be soon. PC Card (formerly called PCMCIA) drives

the size of a deck of cards recently became an attractive alternative. Since all they require in many devices, such as digital cameras and PowerBooks, is a compatible slot, they offer easy data transfer between locations or devices. The drives are available in sizes ranging from 40MB to over 500MB from Microtech International and La Cie, among others. While PC Card readers are fairly rare today in the Mac market, expect to see them in plenty of future laptop and desktop Macs.

Several other new optical formats have been announced but aren't yet available. Sony's MiniDisc (a 140MB, 2-inch MO disk based on an audio format) should perform on a par with single-speed CD-ROM drives—far slower than other removable formats. Given its small storage capacity and inherently slow performance, the MiniDisc will probably be useful only in laptops or personal digital assistants, where small size and low power consumption increase its appeal.

Meanwhile, Compaq, 3M, and Matsushita have joined forces in an effort to produce a laser-based drive that will use

120MB floppies and will support backward compatibility with today's 1.4MB floppies. The drive will come to market this fall but will initially be available exclusively on Compaq computers (see *News*, elsewhere in this issue).

As for larger-capacity developments, several other optical formats should come to market soon, all using 3.5-inch media: Sony's SSD is a 650MB MO drive, Toshiba is working on a 650MB phase-change drive with two-sided disks that yield a total capacity of 1.3GB, and a group of manufacturers is working on an MO drive with 640MB of storage that can read and write to 230MB MO cartridges and read 128MB MO cartridges. Unfortunately, none of these will be compatible with the others (see "Optical Chaos," *News, Macworld*, May 1995). When this appears Pinnacle Micro will have announced its Apex optical drive, which will use 4.6GB cartridges—making it the largest-capacity cartridge-based unit on the market. Pinnacle expects the unit to achieve hard drive speeds, but no prototype was available at press time to verify the claim.

Phase-change dual (PD) drives should also be available by the time this article appears. These drives combine the functions of a 650MB optical drive with a quad-speed CD-ROM player. Future CD-ROM drives may be able to read PD disks. PD drives will sell for around \$800, and media will cost about \$50.

Iomega says by the end of 1995 it will ship a new drive that uses 1GB or 540MB cartridges. It should sell for around \$500, with 1GB cartridges going for about \$100 and 540MB cartridges for \$70. SyQuest recently demonstrated a 1.3GB, two-platter, four-head cartridge drive, with a projected ship date in the first half of 1996. The company has also hinted at other formats and capacities in development.

The Last Word

Selecting from this many choices seems daunting. But once you define your primary storage tasks (backup, data delivery to a service bureau, archiving, or telecommuting), calculate the file sizes you normally need to store, and set a budget, you can narrow the field considerably.

If you rely on a service bureau for output, CD-ROM one-offs, or other services, you should make a few calls before buying, to find out what portable-storage devices your local provider supports. We conducted a survey of several desktop-publishing and digital-image service bureaus, and the results were encouraging. Most support all of the 5.25 SyQuest formats and 128MB MO. Many had just purchased or were about to purchase Zip drives. Some supported 650MB MO drives, and many supported Bernoulli 150MB drives. They all mentioned that they would consider supporting any device format for a regular customer who brings in enough work.

Right now the Zip drive has captured the sweet spot on the low end, while for massive data files the 1.3GB MO drives make the most sense—but don't buy either of these before considering the SyQuest EZ135 and 2.6GB MO drives, which should be readily available when this article appears. If you regularly do online video editing, you should probably stick with the speed and reliability of a dockable hard drive system, and if you are looking for the last word in data archiving you'll use an MO drive scaled to your data requirements. But if you delay your selection by even a couple of months, take a look around before you choose. Portable technologies are proliferating so fast that better solutions are nearly always within reach. ■

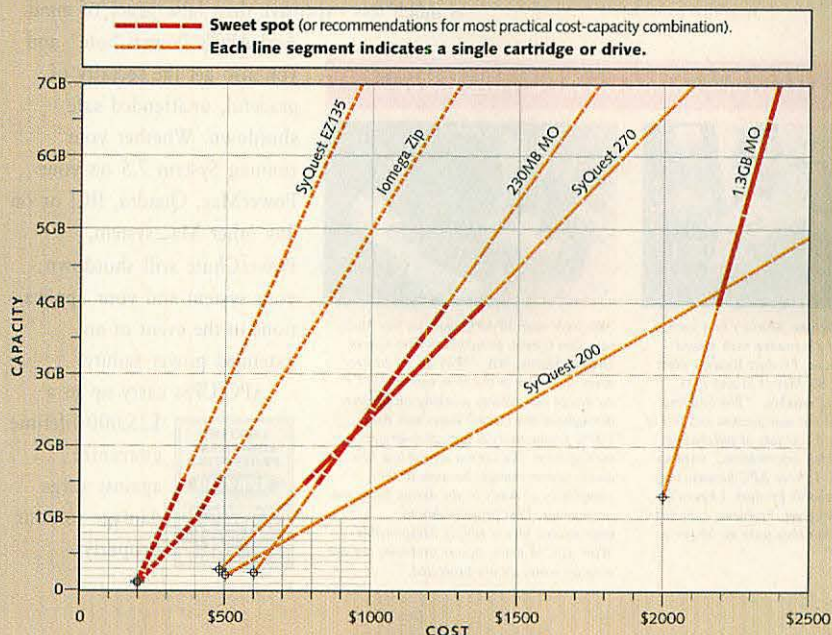
MATTHEW LEEDS is technical-services manager for a major software developer.

Cost versus Capacity: Finding the Sweet Spot

What removable-media device best suits your needs? The answer depends on your data-capacity requirements and budget. This chart plots average street prices of cartridge-based devices against capacity. Each line begins with the cost of a single drive and one disk. The more vertical the line, the more rapidly the cost per gigabyte decreases.

The Zip and SyQuest EZ135 units, based respectively on 100MB and 135MB disks, are the least-expensive devices—but for high capacities they require an impractical number

of disks. In contrast, the 1.3GB MO drives are relatively costly at lower capacities, but as your storage needs grow (to 10GB and up), eventually the 1.3GB MO becomes the least-expensive storage method. Suggestions for the best cost-capacity combination, or sweet spot, are indicated by the red sections in the lines. We do not offer a sweet spot for the SyQuest 200 because, except where backward compatibility is critical, it can't compete with the SyQuest 270.



No matter how fast can't outrun a power

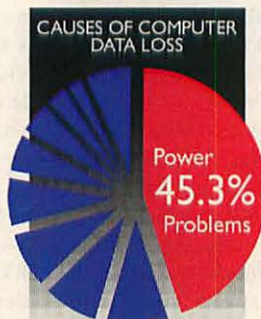
New Back-UPS: reliable power for your Mac

Just don't have the time for power problems on your Mac? Don't worry. They'll make time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes. You can't run, but you can hide, behind APC protection.

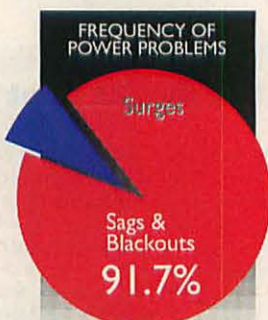
**IN THE NEXT THREE MONTHS,
MORE THAN 30,000,000 PCs WILL BE HIT
BY POWER PROBLEMS...**

A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every Mac plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than escaping power problems. One study found a typical computer is hit 100 times a month, causing keyboard lockups, drive damage, or worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your Mac (which is at far greater risk) vulnerable to loss or damage.



Source: Contingency Planning



Source: Bell Laboratories

Power problems are the leading cause of computer data loss, while the most frequent type of power problems are undervoltages and blackouts, which surge suppressors alone are powerless to protect against.

WHY A \$119 APC UPS COSTS LESS THAN A \$9.99 "SURGE PROTECTOR"...

Contrary to most people's belief, a Mac alone has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without protection is as good as under-spending on one of the most important computer decisions you'll make.

And since sags and blackouts represent more than 90% of power problems likely to hit your Mac, even quality, high-performance surge suppressors are literally powerless to protect your Mac from data loss.

That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent keyboard lockups, data loss, and crashes. With an APC UPS, you get six times the protection of a high-end surge protector for little more than twice the price. And \$119 is much less expensive than false peace of mind.

Add APC's PowerChute* and you also get the security of graceful, unattended safe shutdown. Whether your running System 7.5 on your PowerMac, Quadra, IICI or on any other Mac system, PowerChute will shutdown your system and your applications in the event of an extended power failure.

APC UPSs carry up to a

\$25,000 lifetime
guarantee
against surge
damage to your
properly



More than 3,000,000 satisfied customers count on APC reliability



Modern Press President Stephen Hopkins explains, "I protect my Mac Performa with a Back-UPS 400 and the unit works great. The Mac handles all bookkeeping, administrative and estimating functions for the company. It is a critical piece of my business. Unfortunately, we are located in an industrial park... a nice way of saying that our power fluctuates a great deal. After five years of reliable performance from my Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead."



At Cellophane Square, Seattle's best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II SL and POS terminals running reliably. "The building where we started out was ancient and full of power problems. I lost lots of purchasing and product related information... until we invested in APC. I chose APC because they offer the most reliable product. I haven't been proven wrong yet. Problems continued in the building, but they were no longer a problem for us."



"We have over 30 APC units on our Macs," says Tim Girvin, principal of Tim Girvin Design, Seattle, WA. "Why do we protect every computer in the firm with an APC? As design consultants working on projects throughout the United States and Asia, 100% productivity is critical to project management. We cannot afford lost files due to power outages because of the complexity of many of the design programs we manage. Lost projects due to unprotected files is simply irresponsible. With APC in place, power problems are not even an issue, we are protected."

your Mac is, it problem

starting at \$119

connected equipment, and can suit any application, from servers and PCs, to fax and satellite systems.

PROTECT YOURSELF OR KICK YOURSELF...

It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PCs with the most reliable protection they can buy: APC UPSs. So ask for APC at your favorite reseller. Starting at \$119, an APC UPS is serious protection no Mac user should be without.

MacWEEK "Ultimately, it's more a question of when - and not if - you should buy a UPS... UPS power protection has never been cheaper or more convenient"

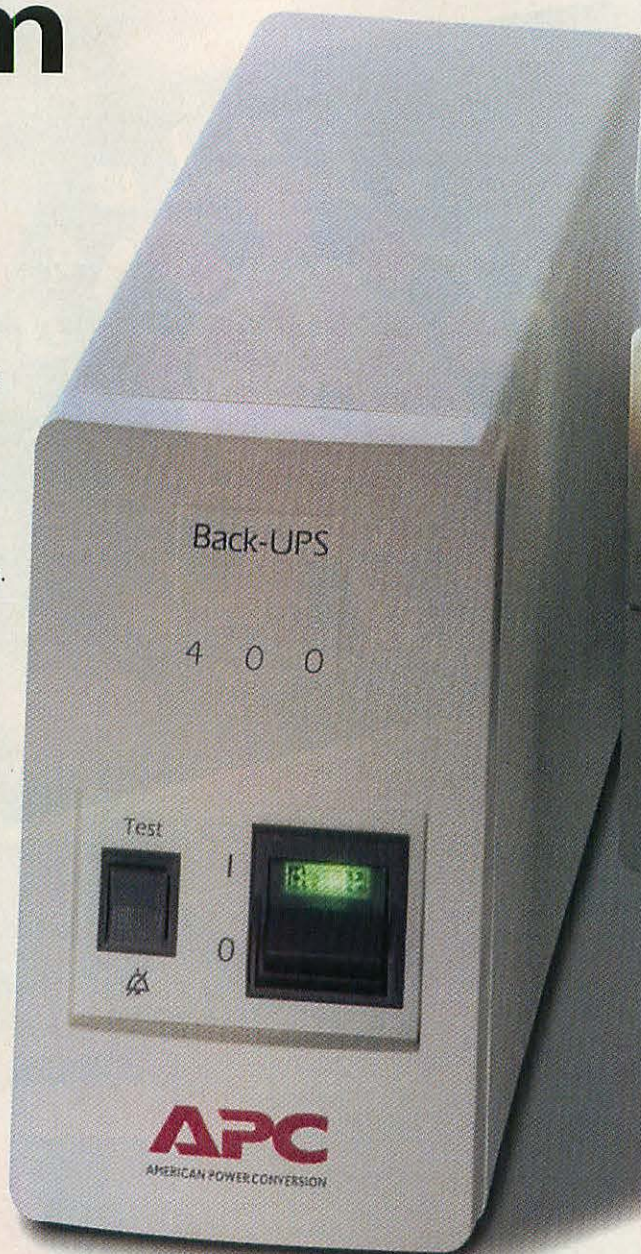
MacUser "If you have a server and don't have a UPS, you're playing with fire."



Back-UPS FEATURES

- ▶ Unmatched surge/lightning protection for maximum hardware safety
- ▶ Site diagnostics automatically spot missing ground and reversed polarity
- ▶ LAN signaling allows simple shutdown with interface kits (400 and above)
- ▶ User replaceable, hot swappable batteries insure uptime safe disposal
- ▶ \$25,000 lifetime Equipment Protection
- ▶ 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

Model	Application	Sugg. List
200	Desktop systems	\$119
280	Desktop systems	\$139
400	MultiMedia	\$199
450	Quadra	\$254
600	PowerMacs	\$359
900	Longer runtime applications	\$529
1250	Multiple systems	\$689



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<http://www.apcc.com>

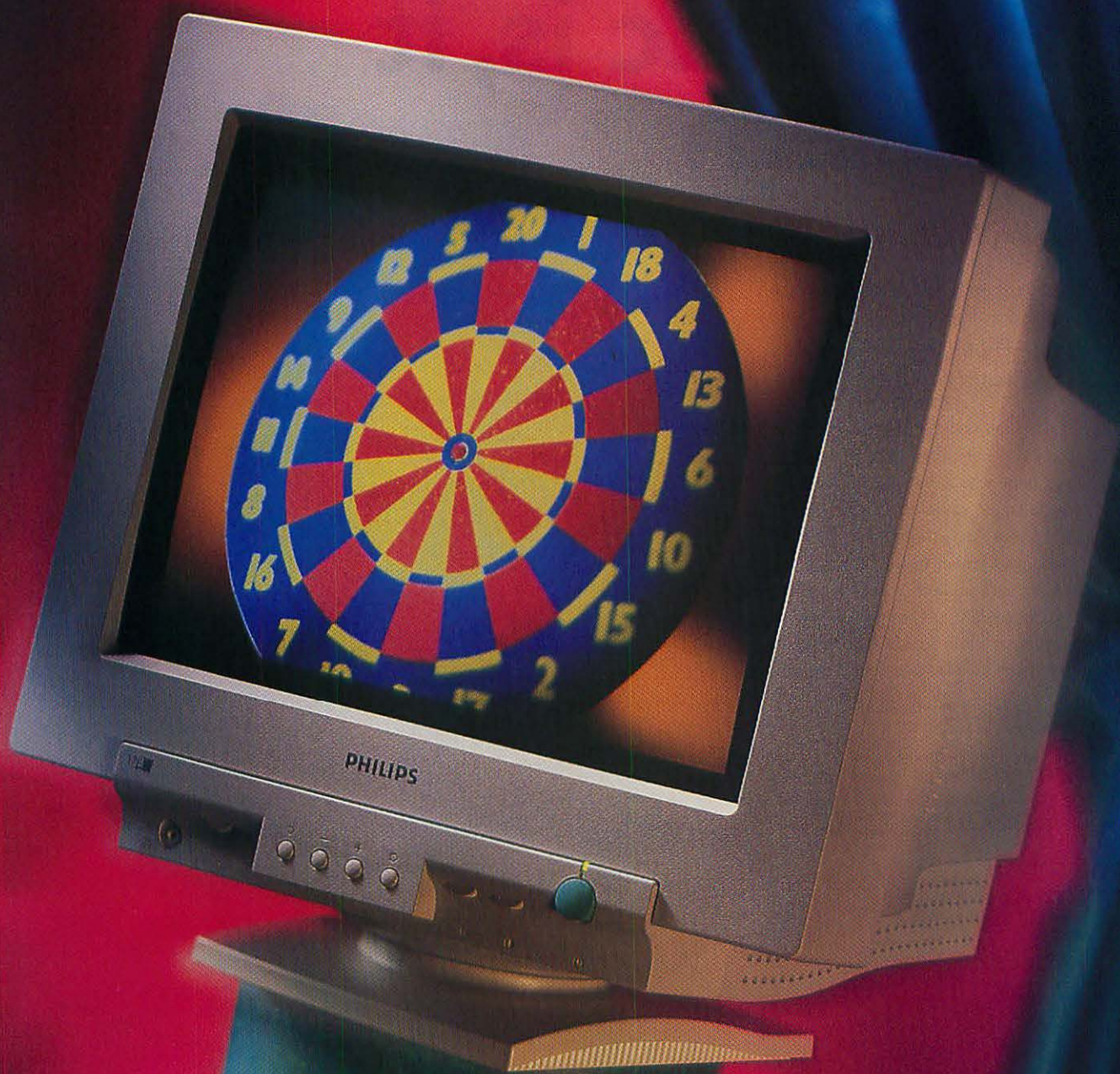
APC products have won more awards for reliability than all other UPS vendors combined



APC[®]

AMERICAN POWER CONVERSION

Call 800-800-4APC



When we compared 17-inch monitors, we were most impressed by the Philips 17B's bright, clear picture and its affordable street price. In this category, manufacturers have added more and more controls for adjusting monitors, but they're not always easy to use; Philips' controls are simple and well designed.

BIG PICTURE, BIG VALUE

MACWORLD LAB RATES

TWENTY 17-INCH MONITORS

THAT COST LESS THAN \$1100



by Peter M Stoller

Spreadsheets that don't spread. Single-page documents you have to page through to read. Graphics obscured by floating palettes. Desktops that remain cluttered even after you clear off nonessentials . . .

If you own a small monitor, this probably sounds familiar. If you're buying a new system, it's a situation you want to avoid. Either way, a larger monitor can make you more productive and your work more enjoyable. But how large a monitor should you get? Going all the way up to 21 inches might take you to the point of diminishing returns. Two-page monitors offer more real estate than most users need, at considerable expense in both dollars and desk space. With 17-inch monitors, however, you get a nice compromise—there's nearly 70 percent more screen-space than with 14-inch to 15-inch monitors, and on average they cost about \$1000 less than 19-inch or 21-inch monitors. (For another alternative, working with multiple monitors, see *Working Smart*, elsewhere in this issue.)

With this target in mind, we brought in 20 monitors to test for both performance and value. We had a few basic requirements for the roundup. The monitors had to be multisynchronous—that is, able to handle multiple resolutions. They had to have a stan-

dard 832-by-624-pixel resolution with a minimum refresh rate of 72Hz, for a flicker-free image. They had to have a dot pitch of 0.28mm or less (or for Trinitron-based models, a stripe pitch of 0.26mm or less), for a suitably sharp image. Finally, they had to sell for under \$1100. (As it turned out, the street prices of all but one are under \$1000.) In addition, we tested 2 high-end 17-inch monitors from Sony and NEC so we could discern what you give up by economizing. (What we discovered will delight your accountant—although the more expensive 17-inch monitors offer a higher resolution and bundle more utilities, they didn't perform any better than the others.)

All told, we subjected 22 monitors to a battery of objective and subjective tests. We examined every monitor for sharpness and brightness, contrast and color, glare and distortion. We also paid special

attention to the controls manufacturers have added to make adjustments to the screen image easier (see the sidebar "A Question of Control: Buttons, Dials, and Menus Compete"). While we've singled out our favorites, the monitors were remarkable for their consistency. With few exceptions, the picture quality was impressive. Macworld Lab's objective test results show nearly every monitor well within the tight specs necessary to produce a good image. As recently as a few years ago, we rarely saw this level of quality, let alone at these prices—half of these models sell on the street for under \$800. In short, there's never been a better time to buy a 17-inch monitor.

Looking Good

What's the top priority when you're buying a monitor? A top-notch image. If the picture isn't bright, sharp, and free from

distortion, you'll find working with the monitor fatiguing at best and damaging to your eyesight at worst.

We measured all relevant aspects of image quality in the lab (see the benchmark "17-Inch Monitors: Compare and Contrast"). While no monitor stood out in all four categories, measurements aren't the whole story. Our panel of experts examined every monitor and discovered that what looks good in specs doesn't always look good on screen.

Two of the most critical factors in image quality are sharpness and focus. If a picture isn't sharp, it means the electron beams that produce the monitor's red, green, and blue phosphor dots (or stripes) aren't perfectly aligned on the inside of the CRT. Technically, it's called *misconvergence*, and you'll see a general blurring or shadows of color around text or images. Only the Princeton Graphic



17-Inch Monitors: Compare and Contrast

The bars below tell an unusual tale: the monitor that's best in brightness is not necessarily the one that's king of contrast. The same goes for convergence and distortion. You want to adjust brightness based on working conditions. None of the monitors fell below 20 footlamberts (considered dull), but the higher numbers mean greater flexibility. The numbers for contrast indicate the ratio between the luminance of white and black squares throughout the screen. Our judges preferred at least a 1-to-9 ratio. The best results for convergence are those closest to 0—that's where the image is the sharpest and the colors the truest. Finally, in distortion, all our monitors shone with scores far less than the 3.5mm guideline for maximum distortion. Use these specific results in conjunction with other factors—price, warranty, your own working conditions—to make a buying decision.

Brightness

Measures maximum brightness at the center of the screen.

Contrast

Indicates the level of detail in both light and dark areas of an image.

Convergence

Indicates how closely a monitor's red, green, and blue electron beams hit the same pixel on screen.

Distortion

Tests the difference between a screen's minimum (left side) and maximum (right side) distortion.

Products are listed in alphabetical order.



BEHIND OUR TESTS

Macworld Lab tested 17-inch multiple-resolution monitors by measuring several aspects of visual quality. We measured brightness and contrast—key determinants of overall quality—with a Minolta luminance meter on a standard black-and-white target screen. We measured distortion, which determines how accurately shapes are displayed, with a black-and-white target that put 1-inch

squares in the corners, along the edges, and in the center of the display. Then, using an antiparallax ruler, we compared the size of the outer squares to the size of the center square. Finally, we measured convergence by using a Klein convergence meter, again at the center and in each corner.—Macworld Lab testing supervised by Matt Clark and Mark Hurlow

The news in the mature landscape of monitors is the controls manufacturers are offering. If only monitors looked perfect at every resolution, adjusting to changes over time to maintain the best picture. But they don't. So monitors have controls for adjusting the screen image. On the monitors we tested, these controls range from no-frills to full-featured, from intuitive to intricate.

On-Screen Controls

The latest trend is on-screen controls, but don't bother upgrading your monitor just to try these. These graphical, menu-oriented digital controls let manufacturers provide easy access to a wealth of features using only a few buttons. But are they more convenient for the user? In most instances, we didn't think so. They weren't necessarily worse than old-fashioned dedicated knobs, but they didn't offer a clear advantage.

We did like the on-screen controls offered by both NEC MultiSync monitors, the Philips 17B, and the Samsung SyncMaster 17GLSi monitors. NEC's On-Screen Manager is more attractive, more illustrative, and easier to use than the average on-screen controls. This utility also provides the most complete

Samsung lets its clearly labeled buttons do more of the work, giving you direct access to several categories of parameters, instead of forcing you to go through several menus to change anything. The buttons are easy to see and have a firm tactile response. They're stored in a suave recessed drawer, making these controls feel positively luxurious. However, Samsung's color controls could be more intuitive and flexible, and its on-screen menu aesthetics can't touch NEC's.

Buttons Alone

Of the monitors without on-screen controls, we liked those from Apple, Mirror, Radius, and Sony. The MAG InnoVision's buttons are simply too hard to see, and they include a gimmicky LCD. The Iiyama uses an LCD far more effectively—it's not as showy as an on-screen display, but it's very functional. Tatung also uses an LCD, but its monitor lacks adjustments for all but the most basic geometry features.

Worst of all are the Genova controls: not only are most parameters lacking, but the buttons are stored in a hidden panel on the right-hand side of the monitor. Try adjusting screen



Peaceful Easy Feeling The buttons on the Samsung SyncMaster 17GLSi reside in a suave recessed drawer. They're easy to see and have a firm response.



Please Review Your Ergonomics You have to stretch your arm around the Genova NuSync 17Xe to adjust the screen geometry, so you can't see what you're doing.



A Good Sign The Iiyama Vision-Master 17's LCD isn't as showy as an on-screen display, but it's very functional when it comes to monitor adjustments.



On-Screen Honors It's hard to imagine anything that could drift out of alignment on an NEC monitor that these complete controls couldn't rein in.

set of controls; it's hard to imagine anything that could drift out of alignment on an NEC monitor that these controls couldn't rein in. But we did appreciate having brightness and contrast knobs as well, so we didn't have to use On-Screen Manager for everyday adjustments.

Philips took a simpler approach with the 17B monitor, using fewer choices to control fewer parameters. But all the essential color and geometry controls are there, and the company was also smart enough to stick with front-panel knobs for brightness and contrast.

geometry with your arm stretched around the monitor—you can't see what you're doing, even if you manage to memorize the buttons by feel. And what if you're a lefty? The team behind these controls needs a refresher course in human engineering.

The most important thing is to be sure you're comfortable with the controls. The main functions—brightness, contrast, image size, and positioning—should be easily accessible. You probably won't be using other controls regularly, so don't be too concerned with them, but check to see what's there. Don't get "featuritis"; more features do not add up to a better monitor.

Systems' Ultra 17 had noticeable misconvergence. The others ranged from very good to the outstanding Mitsubishi Diamond Pro 17TX and NEC's low-end MultiSync XV17.

To test focus, we relied on extremely sensitive instruments: our eyes. We examined a full spreadsheet for clear characters across the entire display area. Only the Genova NuSync 17Xe and the Tatung Omniscan CM17MKR monitors had serious focus problems. We couldn't get a satisfyingly crisp image on the Genova,

and the Tatung was so bad as to render small text nearly unreadable.

Then we looked at brightness and contrast. We measured brightness (or luminance) in footlamberts (ftl)—a measurement of 20ftl is a generally acceptable level of brightness, although some environments may require a higher level for truly comfortable viewing. Too dim an image will result in eyestrain.

At a maximum brightness of just under 25ftl, the Apple Multiple Scan 17 and the MAG InnoVision MXP17F

looked fine. However, you may want to be able to adjust the brightness to greater levels than we were able to get, whether to compensate for very bright lighting in your work space or the inevitable dimming of the monitor over time. Most of the other monitors measured near or above 30ftl—plenty of brightness for the life of the monitor in any lighting environment. The Mirror Technologies Proview 17T, registering nearly 40ftl, was outstanding. But the high-end NEC MultiSync XP17 got a thumbs-down from the

The Big Picture

Company	Monitor	Phone	Toll-Free Phone	List Price	Company's Estimated Street Price	Cable/Adapter	Maximum Resolution
Apple Computer	Multiple Scan 17 Display	408/996-1010	800/776-2333	\$1069	\$970	included	1024 × 768
CTX International	Super Professional 17	909/598-8094	800/888-2012	\$999	\$749	included	1152 × 870
Genova	NuSync 17Xe	310/538-4102	none	\$749	\$699	included	1024 × 768
Iiyama North America	VisionMaster 17	215/957-6543	800/594-7480	\$899	\$790	\$20	1152 × 870
Ikegami Electronics USA	CF-17A	201/368-9171	none	\$899	\$799	free on request	1024 × 768
MAG InnoVision	MXP17F	714/751-2008	800/827-3998	\$1299	\$950	\$20	1152 × 870
Mirror Technologies	Proview 17T	612/830-1549	800/654-5294	\$799	\$799	included	1024 × 768
Mitsubishi Electronics America	Diamond Pro 17TX	714/236-5000	800/843-2515	\$1199	\$1080*	included	1152 × 870
Nanao USA	FlexScan F2•17	310/325-5202	800/800-5202	\$1049	\$934	included	1152 × 870
NEC Technologies	MultiSync XP17	508/264-8000	800/632-4636	NP	\$1099	included	1152 × 870
	MultiSync XV17			NP	\$799	free on request	1024 × 768
Nokia Display Products	Multigraph 447X	415/331-6622	800/296-6542	\$1199	\$999	included	1152 × 870
Panasonic Communications & Systems	PanaSync C1791E	201/348-7000	800/742-8086	\$999	\$699	free on request	1024 × 768
Philips Consumer Electronics	17B	none	800/835-3506	\$899	\$790*	included	1024 × 768
Princeton Graphic Systems	Ultra 17	714/751-8405	800/747-6249	\$659	\$659	\$20	1152 × 870
Radius	PrecisionView 17	408/541-5700	800/227-2795	\$1099	\$949	included	1152 × 870
Sampo Technology	AlphaScan 17gx	404/449-6220	none	\$799	\$725	\$14.95	1152 × 870
Samsung Electronics America	SyncMaster 17GLsi	201/691-6200	800/726-7864	\$999	\$929	included	1152 × 870
Sony Computer	Multiscan 17se	408/432-0190	800/352-7669	\$1400	\$1020*	included	1152 × 870
	Multiscan 17sf			\$999	\$890*	free on request	1024 × 768
Tatung Company of America	Omniscan CM17MKR	310/637-2105	800/829-2850	\$850	\$799	\$20	1152 × 870
ViewSonic	17GA PerfectSound	909/869-7976	800/888-8583	\$995	\$895	included	1152 × 870
	Multimedia Monitor						

NP = not provided by company. Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld determined by phone survey of Los Angeles retailers in June 1995.

panel, despite its maximum brightness of 34fl. Why? Because we couldn't turn the brightness down to a comfortable level.

Equally important is contrast, the ratio of white luminance (1.0) to solid black. After the lab tests, we examined a gray-scale photo with lots of highlights and shadow detail, and found that a ratio of 9:1 was enough to make us happy. The high-end NEC MultiSync XP17 has more than twice that, but then, so does the less expensive Nanao FlexScan F2•17.

We didn't forget that these are color monitors. We also examined them carefully for rich, vibrant, and realistic colors, and we came away impressed. With the exception of the Genova, Princeton, and Tatung monitors, all the reviewed monitors offer some facility for adjusting the color balance (or temperature), and most allow you to store at least one custom setting in addition to one or more preset adjustments. Mitsubishi and Nanao go a step beyond that by bundling Sonnetech's Colorific color-calibration software.

Making Your Resolution

We ran our tests at the standard resolution for 17-inch Macintosh monitors, 832 by 624 pixels. However, being multisynchronous, all the monitors are capable of displaying resolutions of 640 by 480 pixels

and 1024 by 768 pixels. More than half of the monitors we tested displayed at 1152 by 870 pixels as well.

Why go for a multisynchronous monitor? The lower 640 by 480 resolution uses fewer, bigger pixels to show an enlarged image. While impractical for typical everyday use, the lower resolution is great for giving presentations, and it can make all work easier for some vision-impaired users. At resolutions higher than 832 by 624, you can view more of a larger file, such as a graphic or spreadsheet, than you can see at once at a lower resolution. Image details such as text are smaller, but they're still readable with good eyes and a sharp monitor.

Until recently, you had to restart the Mac to change display resolutions unless your monitor or video card came with special software. Now, Apple's Display Manager software—part of System 7.5—puts on-the-fly resolution switching in the Monitors control panel. Display Manager works with the internal video on all currently shipping Macs, some earlier 040-based models, and even some video cards—your vendor can tell you if your particular card is compatible.

You also need a cable or a cable with an adapter that's properly configured for multiple resolutions on a Mac. Only the

Apple and Genova monitors come with Macintosh-specific cables. To make them cross-platform, the NEC and MAG InnoVision monitors have multiple video ports on the back; that way, you can use the cable provided without an adapter. (The MAG InnoVision monitor worked only at a resolution of 640 by 480, however; we needed an adapter for it to work at higher resolutions.)

The remaining monitors require a Mac adapter, because their cables are designed to plug into PC rather than Mac video ports. Half the monitors include a Mac adapter, while for the rest, adapters are available on request for anywhere from \$0 to \$20. Not all of these are multisynchronous adapters, however. CTX, Philips, and ViewSonic gave us single-resolution adapters, while the Princeton manual listed only single-resolution adapters as available options. Fortunately, third-party adapters are widely available for about \$20. They do require you to fiddle with unintuitive DIP switches, but you only have to do it once.

All these monitors worked fine with the multisynchronous adapters, with the exception of the Tatung. The only way we could get it to sync was with a single-resolution adapter—a poor solution for a multisynchronous monitor.

Dot/Stripe Pitch (in mm)	Years of Warranty (Parts/CRT/Labor)	Technical Support
0.26	1/1/1	very good
0.26	2/2/2	unacceptable
0.28	2/2/2	excellent
0.26	3/3/3	very good
0.28	2/1/2	unacceptable
0.26	3/2/1	excellent
0.25	1/1/1	very good
0.25	3/3/3	excellent
0.28	3/3/3	acceptable
0.28	3/3/3	very good
0.28	3/3/3	
0.25	3/2/3	excellent
0.27	1/1/1	excellent
0.28	2/2/2	acceptable
0.28	3/2/1	very good
0.25	1/1/1	very good
0.26	2/2/1	poor
0.26	3/3/3	acceptable
0.25	3/2/3	unacceptable
0.25	3/2/3	
0.26	1/1/1	very good
0.27	3/3/1	excellent

and accuracy of the company's support technicians. Macworld Lab tests. * Company does not provide street prices; estimate

Warranty and Support

After checking the technical details, compare support policies. Some companies offer blanket warranties; others set separate intervals for parts, CRT, and labor. The longest warranties—three years, all-inclusive—are from Iiyama, Mitsubishi, Nanao, NEC, and Samsung. Iiyama will immediately ship a replacement at its expense, provided it has one in stock, if your monitor dies in the first 30 days.

The shortest warranty period is one year across the board from Apple, Mirror, Panasonic, Radius, and Tatung. Since Mirror sells direct, it also offers a 30-day money-back guarantee. Radius bundles a special warranty program called Premium Advanced Exchange: the company will ship a replacement in advance of receiving the defective unit, and at the user's request, a Radius technician will unpack the replacement on-site and remove the old monitor. It's clearly the best warranty program of the bunch (we just wish it weren't so short).

To gauge the quality of technical support, we called each company three separate times, requesting help for problems with solutions ranging from minor adjustments to factory service. For each call, we judged the tech-support crews for their accuracy, accessibility, and helpful-

ness. The technicians ran the gamut from surly and ignorant to service heroes.

Fortunately, most companies rated at least very good in our test. The top-rated companies for support didn't match the favorite monitors in our viewing tests, but ViewSonic and MAG InnoVision got a boost in their scores for their tech support. At the low end of the service spectrum were CTX, Ikegami, Sampo, and Sony, whose technicians were either unable or unwilling (or both) to help.

Buying Tips

Now that you know what to look for, it's time to head out and visit those wide open spaces. Just as you would when shopping for printers, get up close and personal with monitors. Mail order is cheap and convenient, but it's our last choice for monitors. It's worth spending a little more time and money to keep your eyes happy and healthy.

Here's our advice for a smooth trip. Call ahead to make sure the store has the models you want in stock, on display, and attached to a Mac. (The different video standards for PCs make viewing monitors running Windows a poor way to evaluate Mac performance.) Since few stores carry lines from all manufacturers, you may have to make more than one stop.

Bring applications you know, and view them on the monitor. A PowerBook with external video is ideal, as stores usually have limited software on their hard drives and restrict customer access. If you don't have a PowerBook, ask in advance what programs the dealer has installed to save yourself the trouble of bringing them on disks. As for documents, use a spreadsheet or text file to check for crisp characters all across the display. A gray-scale photo with highlights and shadows is ideal for checking contrast, while a color photo should have deep reds, greens, and blues, as well as flesh tones and some secondary and subtler shades. If you work with graphics, assess the color controls.

Ask about the store's return policy. A good return policy is important because image quality varies from unit to unit; a good display unit doesn't mean the one in the box is perfect. Your work environment can also make a difference; what you love under mild incandescent lights may disappoint you under bright fluorescents or vice versa.

The Last Word

The bottom-line question is, does more money buy you more monitor? Not in this bunch. The high-end Sony Multiscan 17se looked good, but no better than several less expensive monitors; and we preferred NEC's low-end MultiSync XV17

to the pricier XP17. We saw no reason to pay extra for the top-of-the-line models.

Choosing the best of the 17-inch monitors, though, wasn't easy. We carefully weighed the test results, pricing, and tech-support ratings before bestowing upon the Philips 17B our Editors' Choice designation. It was the big winner in our subjective tests, even before we looked at its price tag; although Philips doesn't provide street prices, our survey of retailers indicates it'll set you back about \$800. Its bright, clear, richly colored picture is complemented by simple, well-designed controls—a beautiful monitor at a very sensible price. Our only caveats stem from its average technical support.

If you're willing to pay more, the Apple, Radius, and Samsung monitors were particularly impressive in their \$900 to \$1000 street-price range. We'd skip the cheapest monitors; great performance has not slipped below \$700 yet. We wish we could recommend the Sampo AlphaScan 17gx, a leader in price and performance, but its poor tech support scared us away.

We found several contenders at a street price closer to \$800: the NEC MultiSync XV17 and Mirror Proview 17T are fine monitors, while the Iiyama monitor was a particular favorite in this range.

The Philips 17B was certainly our favorite, but it wasn't a runaway contest. You may need a longer warranty, more features, or a higher resolution. Use our ratings and shopping tips to help you pick the monitor that's best for you and your work space. When it comes to 17-inch monitors, this is the time to step back and look at the big picture. **m**

PETER M STOLLER is a Los Angeles-based Macintosh consultant who delights in solving arcane Mac problems in America Online's Macintosh Operating Systems forum.

17-INCH MONITORS



Objective and subjective test results, along with cost and technical-support results, all figured into our final analysis of the best 17-inch monitors.

17B Its bright, clear, richly colored picture is complemented by simple, well-designed controls. It was the big winner in our subjective tests, even before we looked at its \$800 street price. If only the technical support were stronger. **Company:** Philips Consumer Electronics. **List price:** \$899.

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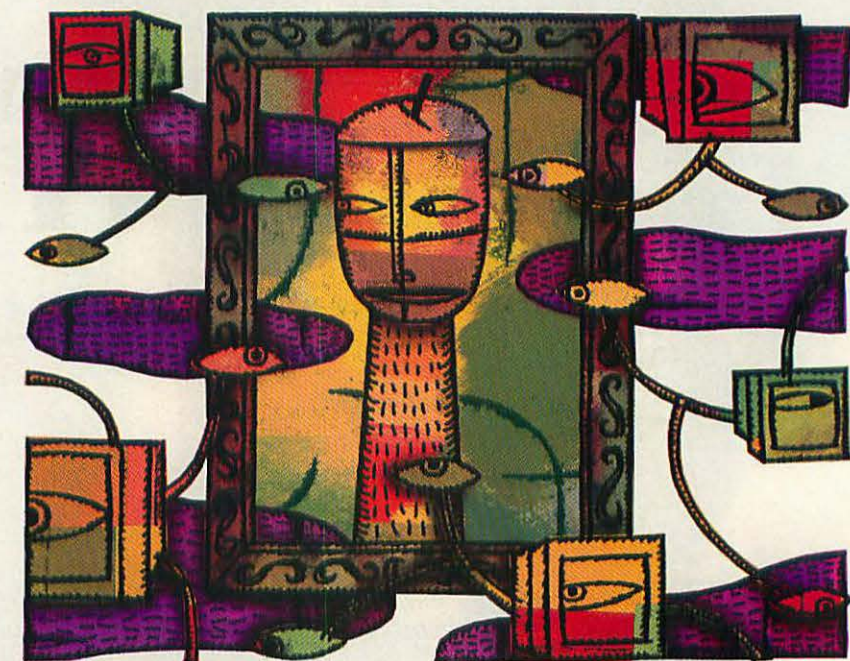
FROM CLIP-ART COLLECTIONS TO fine-art exhibitions, from tips and tricks to technical support, there's an ever-increasing wealth of resources available to graphic artists and desktop publishers on the World Wide Web. Here's a sampling of some new and useful Web sites for graphics professionals.

Publishing and Prepress

- The DTP Internet Jump List (<http://www.cs.purdue.edu/homes/gwp/dtp/dtp.html>) is a convenient place to start exploring the Web. Here, you'll find pointers to font and clip-art databases, desktop publishing discussion groups, and prepress resources.

- PrePress Solutions, which sells and supports hardware and software for the prepress industry, recently launched its Web site, PrePress Main Street (<http://www2.prepress.pps.com/>). The site features a How To & Tips section, where you can download free font-management utilities; read illustrated tutorials on scanning, imagesetter resolution, and software RIPs; and click on pointers to other graphics Web sites with how-to sections. PrePress Main Street also offers a QuarkXPress demo center, from which you can download demos of some 60 QuarkXPress XTensions; a classified-ad section, for posting or searching for jobs and used equipment; original news coverage of DRUPA, Seybold Seminars, Macworld Expo, Siggraph, and other industry events; as well as other services.

- Digital Exchange (d/x), a service bureau and Web-site developer in New York, has unveiled Graphics Web (<http://dx.com/gweb/graweb.htm>), its Web home page. Graphics Web's service-bureau area includes, among other resources, a database of output providers affiliated with the Professional Prepress



RICHARD DOWNS

Alliance; you can search for information on service bureaus by state. In addition, Graphics Web will offer the ability to browse and buy fonts and clip art online by year's end. Later this year, d/x plans to launch Printing Web, a similar Web site for the prepress community, and Photo Web, a site for photographers.

- If you're looking for the perfect typeface, try the Internet Font Directory (<http://jasper.ora.com:80/comp.fonts/Internet-Font-Archive/index.html>). The directory is a database containing hundreds of PostScript Type 1 fonts from Bitstream, Monotype, Wayzata, and other vendors, including font history, descriptions, and thumbnail views. Some fonts are even in the public domain, and those can be downloaded for free.

- For quick access to hundreds of low-resolution images available royalty-

free for downloading, visit the Digital Picture Archive (<http://olt.et.tudelft.nl/fun/pictures/pictures.html>).

- QuarkXPress users might find a trip to The XPresso Bar worthwhile (<http://www.halcyon.com/bobgale/xpresso.html>). Created by a newspaper editor, this lively Web site includes QuarkXPress tips; a guide to hidden features; and reports on new XTensions, bug-fixes, and other Quark news.

Graphics Tips and Tools

- Adobe Photoshop guru Kai Krause's Web site (<http://the-tech.mit.edu/KPT>) features Krause's Photoshop tips (along with illustrations), a Photoshop Techniques newsletter (in Adobe Acrobat format), and downloadable image backgrounds, among other resources. *continues on page 136*

Canvas Goes Beyond Drawing

DENEBA SOFTWARE'S Canvas, always known for its multitude of features, has strengthened its text-handling and design functions, enhanced its drawing capabilities, and even added image editing to its arsenal of tools in version 5. And no, you didn't miss Canvas 4. Deneba (305/596-5644) decided an upgrade this significant justified a leap from 3.5 directly to 5.0.

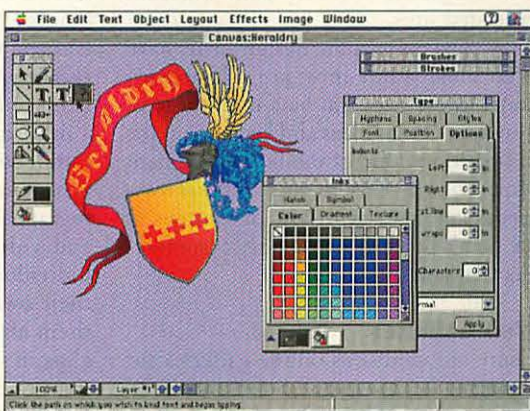
Furthering the trend of blurring the distinctions between the different types of graphics programs, Canvas 5 provides a wide range of features, including tools for creating and manipulating pixel-based images. You can set such brush attributes as size, color, opacity, pressure sensitivity, and antialiasing. Adjustment controls include color balance, hue/saturation, brightness/contrast, curves, and posterization and threshold levels. Variable-selection lassos and marquee tools let you create complex masks. And in addition to its built-in filters, such as Motion, Emboss, and Gaussian Blur, Canvas 5 can accept Photoshop plug-ins. Plus, new color-correction tools let you preview CMYK and adjust out-of-gamut colors.

Typography and layout improvements include applying separate paragraph and character styles in the same layout, hyphenation, word and line spacing, and margin controls.

Canvas's enhanced drawing tools include unlimited undos and an enlarged drawing area (38.5 feet square). You can dynamically apply object blends and multicolor gradients and edit objects without ungrouping them. And the new Freeform command lets you scale, rotate, distort, and skew objects interactively.

Finally, Deneba has taken to heart users' complaints about Canvas's overwhelming interface. Replacing the myriad dialog boxes that 3.5 forced you to wade through are Configuration Managers (one for each palette) that display customization options. Palettes can be torn off and rolled up to minimize clutter.

For \$595 (upgrades from 3.5 are \$149.95; free if 3.5 was purchased after July 1), you also get two CD-ROMs containing over 2000 TrueType and PostScript Type 1 fonts and over 20,000 object-based drawings. A competitive upgrade (\$149.95) is also available for owners of other graphics and layout applications. Canvas 5 is expected to ship by the end of 1995.—C.A.



Canvas 5.0 lets you type and position text on an open or closed path, and the text is always editable—even after you've applied special effects.

Macromedia Solidifies 3-D



IN AN ATTEMPT TO LURE new users into the 3-D arena by offering a complete and easy-to-use package, Macromedia (415/252-2000) is consolidating its diverse 3-D product line into a single product that does it all. Extreme 3D—a modeling, rendering, and animation program that replaces MacroModel, Three-D, and Swivel 3D Professional (Electric Cafe, 415/675-7484, now supports ModelShop)—will target graphics and multimedia creators who previously avoided 3-D programs because of their complexity.

With an interface similar to that of Mac drawing programs, Extreme 3D's spline-based modeler still offers numerical drawing control to 15 decimal places. Users can rotate spline paths in three dimensions, a feature the developer says is unique among both Mac and Silicon Graphics 3-D programs.

Macromedia says Extreme 3D's shader-based Phong renderer keeps rendering times on a Power Mac 7100/80 to under five minutes per frame. High-end rendering features include volumetric lights and support for 8000-by-8000-pixel resolution. The program supports both batch processing and cross-platform (Mac and Windows) distributed rendering.

A separate included program, Extreme FX, lets you composite and process 3-D and other media files into finished stills and clips for use in applications such as Adobe Photoshop and Premiere.

IN BRIEF

■ High-Resolution Display

Radius (408/541-6100) is shipping its top-of-the-line PrecisionView 21, a 21-inch monitor for graphics professionals that supports multiple resolutions up to 1600 by 1200 pixels on a 19.7-inch viewable area. The \$2749 PrecisionView 21 offers on-screen display of digital controls, multiple white-point settings, and cross-platform compatibility for Mac and Windows.

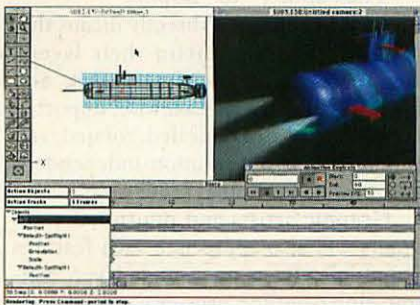
■ Smart Remove Points

BelInfinite (800/554-6624), maker of Infinite FX, a set of plug-ins for Adobe Illustrator and Macromedia FreeHand, has released a new free-ware filter designed by Mac graphic artist Bert Monroy. By providing an easy way to remove geometrically redundant points, Smart Remove Points reduces processing and printing time and allows for faster screen redraws. You can download the filter for free from most major online services or order it on disk from BelInfinite for \$5.

Macromedia says in future versions Extreme 3D will offer its own plug-in format, along with support for drop-in renderers, Renderman, and QuickDraw 3D.

Due in October, Extreme 3D will ship simultaneously for Macintosh and Windows versions 3.1, NT, and 95, at a list price between \$595 and \$795. Minimum requirements for the Mac version are a 68040 processor and 16MB of RAM (PowerPC and 24MB preferred).

Upgrades to Extreme 3D from any of Macromedia's discontinued 3-D applications will be under \$200. Competitive upgrades for owners of other 3-D programs are also planned.—JIM FEELEY



You can change all parameters—including colors, shapes, motion paths, lights, and key frames—over time within Extreme 3D's Score window.

Photoshop users can also look to Adobe's home page (<http://www.adobe.com/Tips/TT.html>) for shortcuts and image-editing inspiration from Russell Brown, the senior art director for Adobe. You can download program updates and free plug-ins for Photoshop, Illustrator, PageMaker, and other Adobe applications; you can also post technical-support questions there.

- Several graphic arts magazines, such as *MacArt* (<http://the-tech.mit.edu/KPT/MacArt>) and *Online Design* (<http://www.cca.edu/online.design/>), have online editions that include tips and tricks for print and Web-page design, as well as in-depth interviews, case studies, and lots of art samples. These online publications make it easy to search past issues and communicate with other readers, and

these magazines typically offer hot links to related sites.

- Several graphic design firms have Web sites. While most are self-promotional, these sites can be a useful way to stimulate design ideas and keep up on the competition. One of the best is Clement Mok Design's Web site (<http://www.cmdesigns.com>), with lots of samples of the firm's product-packaging, corporate-identity, and other designs.

Web Galleries

There are countless online galleries for exploring both computer-generated and traditional art. Most offer a look at many different artists' works; for instance, Pixel Pushers (http://www.wimsey.com/Pixel_Pushers/) showcases thumbnail reproductions of digital works by Diane Fen-

ster, Louis Fishauf, Kai Krause, Buffy Sainte-Marie, and other artists. At the Electric Gallery (<http://www.egallery.com/egallery/homepage.html>), you can wander from one gallery to another, each with a different theme. And Art on the Net (<http://www.art.net>) is an international cybershowcase for some 65 artists, photographers, poets, sculptors, performance and video artists, and musicians. The individual artists curate and maintain their own online galleries, and some of them also provide downloadable audio clips in which they give brief introductions to their work.

Other galleries focus entirely on a single artist. Los Angeles designer Bonnie Carasso's Web site (<http://www.carasso.com/design/art.html>) displays samples of her multimedia and logo designs, along with downloadable audio clips in which Carasso explains her work.

Finally, there are several Web sites where you can post samples of your work. Design Online (<http://www.dol.com>), for instance, has an area for artists' résumés and portfolios. Kaleidospace (<http://www.kpspace.com/km/kpspace.sys/pages/kpspace.html>) is a commercial service that showcases artists' works in a variety of media (for a monthly fee).

Expect to see two new artists' agencies on the Web soon. In early August, United Digital Artists (UDA), a new-media agency that represents some 400 artists working in digital and interactive media, plans to launch its digital "artists' quarter" online (<http://www.uda.com>). UDA's Web site, designed with hand-drawn icons and black-and-white photography, will feature a gallery of members' works, as well as a listing of workshops, links to design and art magazines online, a tips and tricks area, and a café (an online chat forum).

By early 1996, Artists On-line should have a fully functional Web site up and running (<http://www.online.com/>), as well as a private, subscription-based, dial-up network available for an as yet undetermined monthly fee (call 214/255-6861 for more information). Although most of the subscription services will also be accessible via the Web site, the subscription network is expected to offer faster access and searches. Artists On-line will enable publishers, art buyers, and others to use extensive keyword searching to find the artwork that suits their needs, whether it's a sculpture, line drawing, or Photoshop collage. Among the searching criteria are artistic style, media, physical dimension, geographic location of the artist, artist's name, and color.—JAMES A. MARTIN

After Effects Targets Graphic Artists

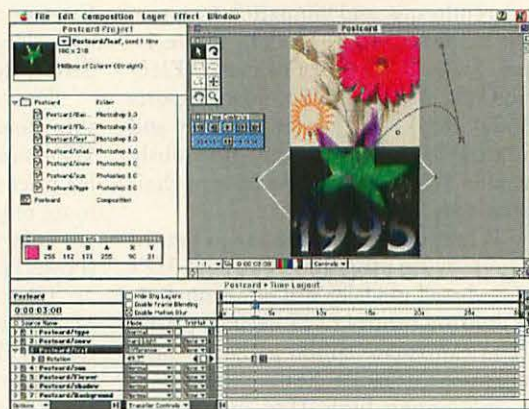
WITH AFTER EFFECTS 3.0, ADOBE SYSTEMS (415/961-4400) is targeting its first new release of the high-end video-processing and animation program (formerly owned by CoSA and then Aldus) to Photoshop users and other graphic artists who want to move into multimedia production, as well as to film and video professionals. After Effects, which lets Macs perform high-resolution compositing, 2-D animation, and special effects for television, film, and multimedia—tasks that were once restricted to SGI machines or dedicated hardware—will offer enhanced controls for time, motion, properties, and key frames. And—like PageMaker, another recently acquired Adobe product—After Effects will be tightly integrated with Photoshop and Illustrator, all for \$995.

The ability to import Adobe Photoshop 3.0 directly means that Photoshop files maintain their layers, clipping groups, transfer modes, and transparency settings. Likewise, imported Illustrator files can be scaled, rotated, and manipulated in a resolution-independent vector mode until final rendering.

Graphic artists and multimedia designers will also appreciate such features as multiple effects on a single layer, real-time alpha-outline previews, visual control paths, and Bézier masking, while film and video users will find support for D-1 aspect ratio pixels, 3:2 pulldown for film-

to-video transfer, improved video source deinterlacing, and batch rendering especially useful.

The standard version, including more than 50 special effects, will retail for \$995; a \$1995 Production Bundle adds professional-level plug-ins for keying, matting, distortion, and motion and device con-



One of Adobe After Effects 3.0's most powerful new features is the ability to import Photoshop layers and manipulate them as separate objects.

Upgrades to the Production Bundle from After Effects 2.0.X will be \$99; \$1295 from the standard 3.0 version.

Set to be introduced at Macworld Expo and Siggraph in August and due this fall for both Power Macs and 680X0 machines, After Effects requires an FPU and System 7. Adobe recommends System 7.5, at least 32MB of application RAM, two color monitors, and a 500MB hard drive.—JIM FEELEY



If throwing away a beautiful print pains you,
think of what it's doing to your profits.

Every time you send out for a color print and decide not to use it, you kill off a little bit of your profit. Just because you know the value of tweaking. Just because your client demands a continuous tone, dye sublimation comp. Just because you're doing your job.

But if you had a Professional ColorPoint 2, you wouldn't have to sacrifice profit for quality. Because it's actually two printers in one. Use the economical thermal wax transfer mode, and tweak comp after comp for about a buck a piece. Then, when you're ready to show your client, switch to dye sublimation mode and output beautiful, photorealistic prints for less than half of what you'd pay a service bureau.

The Professional ColorPoint 2 has a large print area which allows for full-bleed letter and

11" x 17" tabloid printing. It prints 300 dpi in both modes, has embedded Adobe's PostScript level 2 software, and supports the color management system



that you need. What's more, it comes with an internal hard disk and all the RAM you need to output gorgeous, 4-color, full-bleed prints right out of the box.

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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Dennis Orlando is an award-winning graphic designer, advertising creative director, and fine artist based in Ivyland, Pennsylvania. His work has been exhibited and published internationally in books, magazines, calendars, videos, and on CD-ROM.

How It Was Done: The digital painting *Chair with Tulip Tree Flowers* was inspired by a still life Orlando photographed years earlier for use as painting reference material. Orlando sketched the basic composition of the image in Painter with the pencil tool. To minimize drawing time and keep the sketch loose, he worked at a low resolution (72 dpi) during most of the creation process.

After setting the Hue, Saturation, and Value sliders in Painter's Colors palette, Orlando then quickly blocked in large areas of color with the Artist Pastel Chalk brush. This enabled him to lay down a variety of colors that would harmonize with one another.

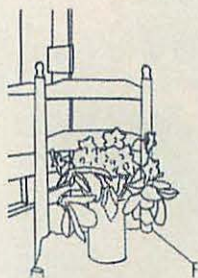
To produce a soft, painterly look overall, Orlando applied the Total Oil variant of Painter's Liquid Brush to the rough pastel brushstrokes. Applying the Soften filter further refined the image.

To create more drama, Orlando used Painter's Lighting Effects in the Surface Control pull-down menu to simulate a shaft of sunlight. After repositioning the light source, he experimented with various lighting parameters until he achieved the desired effect.

Orlando added brightness and contrast in the Tonal Control pull-down menu. He blended the effects of the filter back into the surrounding area and refined other areas of the painting.

Orlando's final steps were to resize the image from its original 72 dpi to its final output resolution of 300 dpi, and to add fine details in high-res mode using the Water Drop and Liquid brushes.

At various stages, Orlando output Fiery color proofs to check colors and techniques, before having the image output as limited-edition Iris prints on archival watercolor paper. ■



1 Using both the freehand and straight-line drawing styles with Painter's pencil tool set to grainy soft cover, Orlando outlined the chair, wall, flowers, and vase. With the Large Canvas texture from the Paper palette as his surface texture, Orlando sized and positioned the objects.



2 Moving the Color Variability sliders to adjust the image's hue, saturation, and value ranges in Painter's Colors palette allowed Orlando to increase the number of hues and the ranges of color intensity and brightness values in each brushstroke.



3 He used the Artist Pastel Chalk brush to simulate a traditional-media technique: setting a light-to-dark tonal range and determining the angle of the light source. This, in conjunction with the Color Variability controls, enabled him to add shadows and deeper tones, unifying the composition with a richer range of colors.



4 Using the Liquid Brush's Total Oil variant, Orlando smoothed and refined the rough pastel brushstrokes before applying the Soften filter in the Focus Controls pull-down menu (under the Effects menu).



8 A detail of the image after Orlando upped the resolution to 300 dpi. Then, using the Water Drop's Grainy Water variant and the Liquid Brush's Total Oil variant, he sharpened and brought out areas of the flowers and the chair, while making areas like the wall and the shadows recede into the background.



THE TOOLS

Hardware: Macintosh IIfx with 20MB of RAM and 210MB internal hard drive; 2GB external hard drive; 88C SyQuest removable-cartridge drive; SuperMac Spectrum/24 Series III video board; SuperMac Color 20" Display; Wacom ArtZ ADB Tablet, Wacom ArtZ II, and SummaGraphics SummaSketch FX graphics tablets; EFI Fiery 125i attached to Canon Color Laser Copier 300 (for color proofing).

Software: Fractal Design Painter 3.0



5 To create a more dramatic image, he used Lighting Effects in the Surface Control pull-down menu to simulate a shaft of sunlight. With the Plain Light variant selected, he repositioned the light source in the Preview window, then used the sliders to adjust the brightness, distance, spread, and exposure.



6 After the artist applied the Lighting Effects, including moving the light source to the upper-left corner of the image so that it originated from just above the top of the chair.



7 After boosting the brightness and contrast by moving the sliders in the Tonal Control pull-down menu (under the Effects menu), Orlando pulled color from one area to another with the Liquid Brush to blend the lighting effects into the surrounding areas, giving the image a soft, natural look.

EDITED BY CAMERON CROTTY

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

Dial M for Macintosh

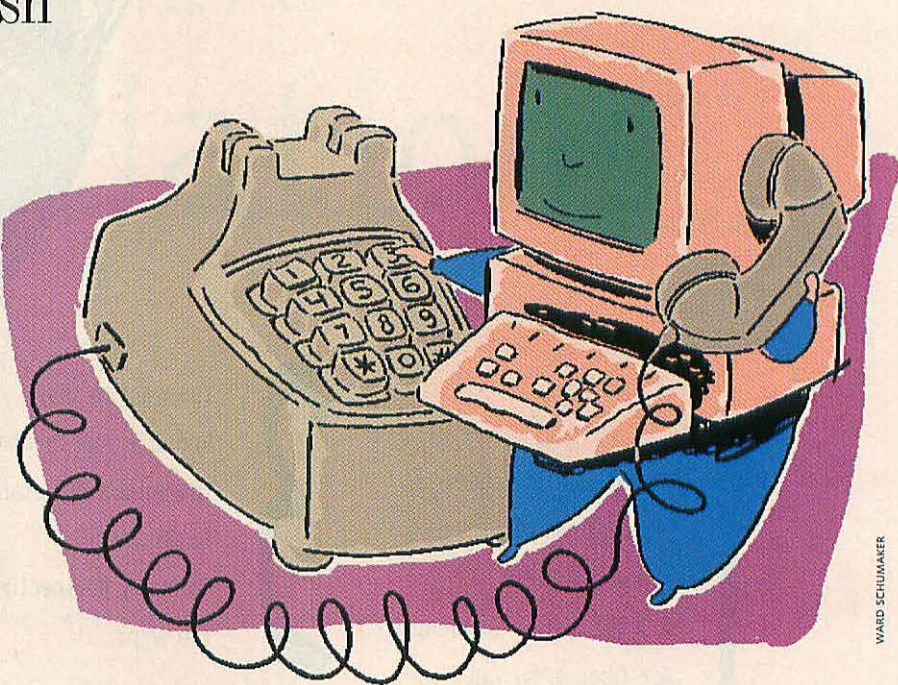
THE TWO MOST POWERFUL COMMUNICATION devices on your desk are the telephone and the computer, and leaders in both industries are scurrying to combine that power. Almost a year ago, Apple, AT&T, IBM, and Siemens announced the formation of Versit, a group dedicated to creating specifications for interoperability between phones and computers. Now the first Versit specs are appearing, and computer/telephone integration (CTI) is heating up.

Dialing for Dollars

Unlike that of most technologies, CTI's value is immediately clear to businesses. It can increase employee productivity and improve customer service at a time when doing both provides a clear competitive advantage. For instance, with CTI systems in place, users can log time spent on the phone and more accurately track their billable hours. In some cases, users already on the phone can identify who's calling and decide whether to take the call or send it to voice mail.

Rapid service is the name of the game for companies that mostly deal with their customers over the telephone, such as catalog-sales or health-care firms, for example. With the help of CTI systems, customers can dial an account number on the telephone keypad even before talking to a human, so that the appropriate data appears on the monitors of customer-service representatives at the same time the call arrives. The goal is to harness the power of the telephone system with the power of the computer.

There are even potential benefits for CTI on the desktop: in telephony-enabled applications, you can make outgoing phone calls simply by clicking on a number in a database or a PIM, saving both dial time and charges for any numbers you happen to misdial.



WARD SCHUMAKER

Telephony Teamwork

Although Apple has traditionally been an individualist when it comes to new technology, this time it's working with industry powerhouses. AT&T is the largest vendor of private branch exchange phone systems (PBXs), with 31 percent of the market, according to the market-research firm Dataquest. Along with Novell, AT&T developed the Telephony Services Application Programming Interface (TSAPI) to smooth integration between servers and PBXs. Siemens owns Rolm, the number three PBX vendor with 7.5 percent of the market. IBM, which used to co-own Rolm with Siemens, brings to the Versit group its switch-independent CallPath software for routing calls and database information; CallPath runs on mainframe, Unix, and OS/2 systems.

Despite the combined experience of the other partners, one of the first available Versit specs has come from Apple.

Apple's two-year-old GeoPort technology is the basis for the Versit GeoPort Universal Network Port, a desktop serial interface that originated in the Macintosh Telephony Architecture (MTA), which dictates how the Mac OS interacts with telephony-aware applications. GeoPort is currently being used only by Cypress Research's MegaPhone software (reviewed this month as part of Apple's GeoPort Telecom Adapter Kit). Voice processing developer Aox is still in the preliminary development stages on GeoPort products and would not comment about any product or release schedules.

The other available Versit spec is the Personal Data Interchange Specification, which allows the transfer of information via wired and wireless connections. The Versit IR spec is based on the Infrared Data Association's specification, already in use with Hewlett-Packard's palmtops and notebooks.

Although the Versit group had planned to release its third specification by the end of June this year, the arrival of the so-called CTI encyclopedia was pushed back later into the summer, Apple executives said. The specification will ease the integration of PBXs—which have been notoriously proprietary in their implementation—with computers over an Ethernet or a TCP/IP network. Because the part of the spec that covers PBX integration is still in such a preliminary form, no developers have specifically committed to building applications that deal with this connectivity.

More than 100 developers have committed to writing telephony applications

based on Novell and AT&T's TSAPI standard, but few are shipping. And while Versit is based on TSAPI, no one knows how easy it will be to move those applications to Versit-compliant platforms.

It should come as no surprise that Microsoft is also working on desktop-to-PBX integration; it created the Telephony Application Programming Interface (TAPI) with Intel, whose Universal Series Bus is the counterpart to GeoPort. And given Windows NT's popularity gains as a server operating system, Microsoft is already thinking about a server version of TAPI. But Apple's choice of partners should serve it well in what for now is a battle of standards.—HOWARD BALDWIN

faster and easier than using Apple's Newton Connection Kit. Symantec claims that after the initial synchronization process, subsequent syncs will take between one and five minutes.

ACT for the Newton stores its contact and calendar information in the MessagePad's data soup; in fact, Symantec didn't bother to build a calendar module, relying instead on the Newton's built-in software. Users can set alarms and send E-mail from within the software, and ACT for the Newton also includes a letter generator that automatically inserts contact and date information and can type frequently used phrases. Users can also save their letters as templates.

The software takes up roughly 280K of RAM, and Symantec expects it to carry a street price of less than \$100.—C.C.

Newton Gets Its ACT Together

SO FAR, THE LIST OF NEWTON SOFTWARE developers reads more like a Who's That? than a Who's Who. But now Symantec (503/334-6054) is shipping ACT, the company's industrial-strength contact-management software, for the Newton.

Current ACT users will see the quick-benefit of ACT for the Newton. Using Apple's Desktop Integration Libraries, Symantec wrote its own module to synchronize contact databases between the PDA and a desktop machine. In a demonstration of beta software, the company showed a process that was significantly

QuickBooks Pro Accounts for Time

REACHING OUT TO THE LEGIONS OF service-based small-business owners, Intuit (415/322-0573) has shipped QuickBooks Pro, the latest update to QuickBooks. The new version integrates time tracking, estimate creation, and job-cost analysis with payroll and traditional accounting features.

QuickBooks Pro eases complex tasks by making key information available across the program. For instance, business owners can track the work schedules of several employees and then easily use those schedules to create invoices and cut paychecks. Similarly, QuickBooks Pro keeps a file of services and inventory items, complete with original prices and markup, which users can draw from to create job estimates. Information about finished jobs then becomes a resource to help users analyze their activities—customizable reports show

which products, services, and employees generate the most profit.

Intuit expects QuickBooks Pro to sell for a street price of \$189; the package is available now.—C.C.



KEVIN CURRY

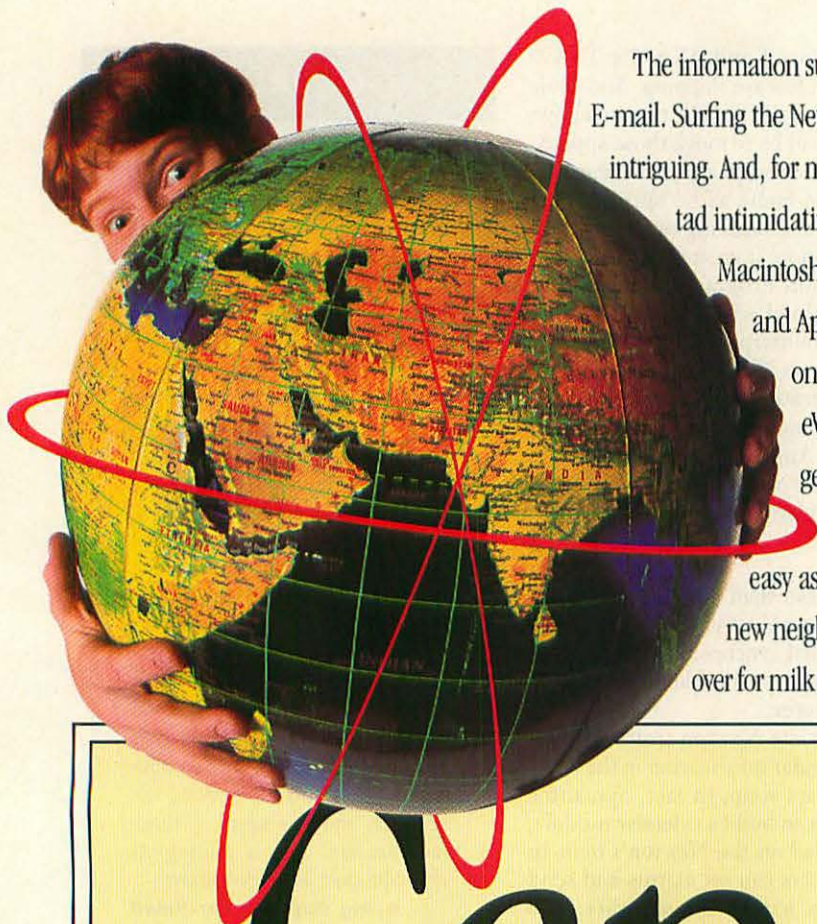
IN BRIEF

■ **Calling Apple** The Apple Business Consortium (ABC), an association of Macintosh accounting and business-productivity developers, manufacturers, and consultants cofounded by Apple Computer, now has a toll-free number (800/681-4636) for businesses seeking guidance. Callers will reach ABC staff members who can provide information on local Macintosh business-productivity consultants and listings of products.

■ **4D Goes Cross-Platform** ACI (408/252-4444) is shipping a Windows version of its 4th Dimension (4D) relational database (\$895); until now, 4D was a Macintosh-only product. The Windows and Mac versions have a common code base, and ACI says developers will be able to use their Macintosh 4D databases on the Windows product, and vice versa, without modification. ACI is porting its entire product line to Windows.

■ **Big Business for Small Business** Automatic Software (408/725-7200) is shipping its first product: Big Business, a Macintosh-only management tool for small businesses. The software is based on a relational database and has sales (quote generation, order processing, credit limit), marketing (customer and prospect files), inventory (invoicing, price lists), and financial sections. Users can add custom fields that appear in all modules. Big Business will cost \$379 (company's estimated street price) for a single-user version; a two-user package will go for \$779.

■ **Secure That Drive, Mister!** Apple's switch from SCSI to IDE drives on some Macs left security-conscious users who wanted driver-level protection out in the cold. Version 1.5 of DiskGuard (\$79.95 company's estimated street price; ASD, 909/624-2594) works with IDE drives. Also, DiskGuard 1.5 now protects individual floppy disks and makes folders locked by primary users invisible to secondary users. DiskGuard Remote has also been upgraded to version 1.5, and is available in packs of five and ten (company's estimated street prices \$270 and \$450, respectively).



The information superhighway. E-mail. Surfing the Net. It sounds intriguing. And, for many of us, a tad intimidating. But the Macintosh® Performa® and Apple's own on-line service, eWorld™, make getting started on-line as easy as inviting the new neighbor kids over for milk and cookies.

article for a school project. For kids, the Internet turns what they may see as, the "drudgery" of research and report writing into the excitement of discovery. What's more, Apple's own eWorld has quite a few "kids only" sections, where they can share ideas and stories with other children in a fun, friendly environment. They can even begin exchanging e-mail with new friends from all over the globe.

Performa. The family vehicle for the information superhighway.

Most Performa models come with a modem and all the software you need to get on-line right away. Plug the telephone line into the modem, follow the simple tips provided by the launch



The Performa and Apple's own eWorld make it easy for you to start exploring cyberspace. And it's so easy to set up, you probably won't even have to ask your kids for help.

program and vroooooom! — you've just merged onto the information superhighway. For a Macintosh reseller near you, call 800-538-9696, ext. 215. We'll connect your family to the most important power of all. The power to be your best.®

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BY JIM HEID

Working Smart

Monitor Mastery

IS YOUR DESKTOP BIG ENOUGH? I REFER not to the slab of polylaminated fiberboard on which the family photos rest, but to the electronic desktop that holds your icons and Trash Can. If you're using a 14-inch monitor to create big spreadsheets, write long documents, lay out publications, or retouch photos, you're looking at the Macintosh world through a keyhole. And you're probably spending too much time scrolling around and squinting at reduced views that shrink type to bottom-of-the-eye-chart proportions.

One solution is a larger monitor—such as the 17-inchers compared in this issue. But when you get that new picture window, don't put your old monitor in the classifieds—put it alongside the big one. The Mac Operating System supports connecting several monitors to a single computer, and the desktop grows to the combined area of them all. You can drag windows from one display to the other or position a window to span displays.

Two monitors do more than just give you a bigger electronic desktop: they provide a great deal of flexibility and convenience. And if you have one large-screen monitor, such as a 19-incher, the tips in this column may inspire you with ways to work smarter on a single monitor.

Connecting and Configuring

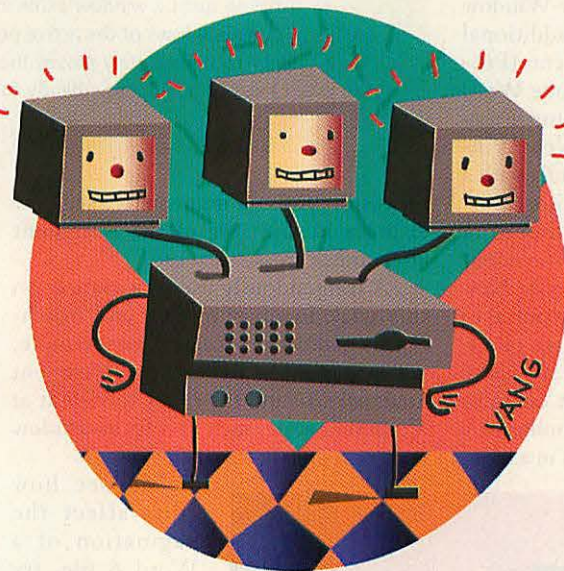
If you have a Power Mac 660AV, any 7100 model, or any 8100 model, your Mac already has the video circuitry for two monitors; other Mac models need a video card for each added monitor. Mail-order street prices for basic NuBus video cards are about \$500 to \$700; video cards for Power Macs with the new PCI bus cost less.

All current Mac models can connect to multiscanning monitors designed for PCs as well as Macs. Some older Mac models, however—including the Quadra 610, 650, and 800—have trouble with some PC-oriented monitors, including VGA displays. These Macs transmit a video-sync signal on the same wire that

carries the green information. This sync-on-green signal can produce an ugly greenish tint on VGA monitors. Apple has changed its display interfaces, but it's still smart to verify Mac compatibility when ordering.

The key to configuring multiple monitors is the Monitors control panel or, on the Power Mac 7500 and 8500, the Sound & Displays control panel. The setup choices you make include:

Menu-Bar Location I recommend putting it on the smaller monitor; reserve the larger monitor for document windows.



Bit-Depth Settings You can mix color and gray-scale settings—for example, configuring one monitor at 2 bits for black and white and the other at 24 bits for millions of colors. But remember Rule Number 1 of bit depths: lower bit depths yield faster performance. Use low bit depths for a large monitor displaying thumbnail views of your files. A terrific tool for bit-depth switching is the ScreenEase extension that accompanies CE Software's QuicKeys (\$119, 515/221-1801). You can create keyboard shortcuts that switch depths and even specify whether ScreenEase switches both moni-

tors, a specific monitor, or the monitor containing the mouse pointer.

Desktop Configuration This time, I am referring to your slab of polylaminated fiberboard. Two monitors provide twice the opportunity for eyestrain and neck aches, so take care to set them up sensibly. I configured mine so that the monitor I spend most of my time looking at is directly in front of me, with the second monitor to its side at about a 20-degree angle. If you find yourself using one monitor more than the other for a particular project, be sure to adjust your sitting position and keyboard and mouse locations accordingly.

Tool-Bar Strategies

It's a rare program that doesn't use at least one floating palette or tool bar—if not half a dozen of them. You can survive this ugly trend in interface design by stashing tool palettes on your smaller monitor, reserving the larger monitor for document windows. For one large monitor, set aside a spot for palettes where they won't obscure document windows.

Similarly, you can stash your word processor's Find and Replace windows on the auxiliary monitor (or out of harm's way on a large monitor) and keep them open all the time. The same applies to Word 6's Go To and Spelling windows—keep them open and you can zip around within a document or check spelling with a mouse-click. WordPerfect also lets you keep its spelling-checker window open on a second monitor; it doesn't let you keep the Go To window open, however.

Most programs remember where you park their palettes and put them back where you left them the next time you run the program. Applications I tested that

continues

do this include Microsoft Word 6 and Excel 5; Adobe Premiere, Photoshop, Illustrator, and PageMaker; Macromedia FreeHand; and Fractal Design Painter. The Finder also remembers the positions of its desk accessories—for example, the Scrapbook and Key Caps.

You can also drag the download-progress box from eWorld or America Online to a second monitor or to the corner of a large screen. This lets you keep tabs on a download while you work in other programs. (Alas, working in other programs often lengthens downloading times.)

Modal dialog boxes—the kind that cause the Mac to beep if you click outside of them—present special challenges to multimonitor users. You can't switch to a different program when a modal dialog box is open; you must OK or cancel it first. To avoid a long mouse journey, use the keyboard to deal with the dialog: press return to OK it or ⌘-period (.) to cancel it. Or you can use a shareware utility such as Snap-To, which automatically moves the pointer to a modal dialog box when it opens (see "More Display Tips").

Document-Window Strategies

Many programs provide a New Window command that lets you open additional windows into the same document. (Programs with this capability include Word 6, Excel 5, Photoshop, Illustrator, FreeHand, and ClarisWorks.) A New Window command pairs up beautifully with a second monitor or a large monitor.

For starters, you can view and work on different portions of the same document at the same time. Just choose New Window and then drag the new portal to your other monitor or, on a large monitor, alongside the first window. If you're working with a document that contains links of any kind, such as formulas in a spreadsheet or cross-references in a word

processor, you can immediately see how changes in one area of the document affect other areas.

A tremendously useful variation on this trick involves mixing and matching magnification scales. For example, use one monitor to view the document at actual size and the other to view it at a different scale, such as a fit-in-window view or a greatly enlarged view.

To see how edits affect the pagination of a Word 6 file, try this: position one window to fill your largest monitor, switch to page-layout view (⌘-option-P), and then reduce the magnification scale so that you can see multiple pages at once, creating what I call a thumbnail view. Do your typing and text editing on the small

monitor at 100 percent magnification and in normal view. This gives you the best of both worlds: the fast scrolling of normal view and the WYSIWYG benefits of page-layout view. (It's also fun to watch the reduced-scale view change as you edit in the full-size window, but your Mac's performance can suffer. If your Mac bogs down as edits ripple through the thumbnail view, close the thumbnail window or temporarily switch it to normal view.)

This mix-and-match scheme also teams up nicely with drag-and-drop editing: to move a paragraph or a block of spreadsheet cells from page 2 to page 6, for instance, use the thumbnail view. A thumbnail view is also great for Word 6 spelling-check sessions; Word highlights suspected misspellings, so you can see at a glance where they occur. ■

Next month: Desktop printing with QuickDraw GX and PrintMonitor 8.0

Contributing editor JIM HEID used two monitors while producing his Macworld Power User Clinic CD-ROM, which comes with his 1200-page *Macworld New Complete Mac Handbook* (IDG Books Worldwide, 1995).

MORE DISPLAY TIPS

Here are more tips for managing monitor setups, and some information on several monitor-related free and shareware gems that I've posted on Macworld's online forums. (For details on accessing these, see *Macworld Online*, in this issue.)

Use Resolution Wisely Most video cards and Macs can drive a monitor at several resolutions. Use lower resolutions such as 640 by 480 to make text more readable or to simulate a 14-inch monitor when preparing an on-screen presentation. Use higher resolutions to see more of a document at a time or for thumbnails.

To change resolutions using the Monitors control panel, select the monitor's icon and then click on Options. (With the Sound & Displays control panel, double-click on the appropriate monitor to open the Configure dialog box.)

System 7.5 can switch resolutions on the fly; older system software requires a restart to put the new resolution into effect. (The Sound & Displays control panel also lets you move the menu bar to a different monitor without restarting.)

Use Alias Shortcuts To avoid long mouse journeys across a large monitor—or across multiple monitors—make aliases of your hard drive, often-used folders and servers, and the Trash, and move them to convenient locations.

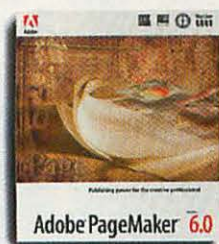
Use Monitor Tools Shareware and freeware utilities can simplify working with a large monitor or with multiple monitors. Here are five examples.

- ApplicationMenu lets you assign a modifier-key/mouse-click combination that makes the Mac OS's Applications menu pop up at the mouse pointer's current location—no long trips up to the menu bar to switch programs.
- OmegaWindow lets you use the keyboard to switch between and hide applications, or to move, resize, zoom, and activate windows. QuickKeys can do most of these things, too.
- WrapScreen implements a wrap-around pointer: for example, as you keep dragging to the right, the pointer appears at the left edge instead of stopping at the right-hand edge of the screen.
- TitlePop turns a window's title into a pop-up menu: open it, and you can switch to other windows of the active program or windows of other programs.
- Snap-To immediately moves the pointer to the default (highlighted) button when a dialog box opens—handy for large screens.

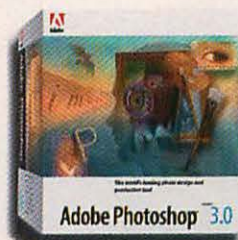


One of the Mac's underappreciated features is its ability to treat multiple monitors like one big desktop. Notice the fish's window split across both monitors.

KEVIN CANDLEMAN

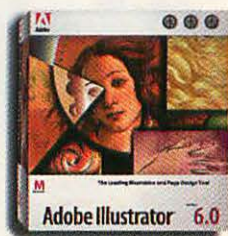


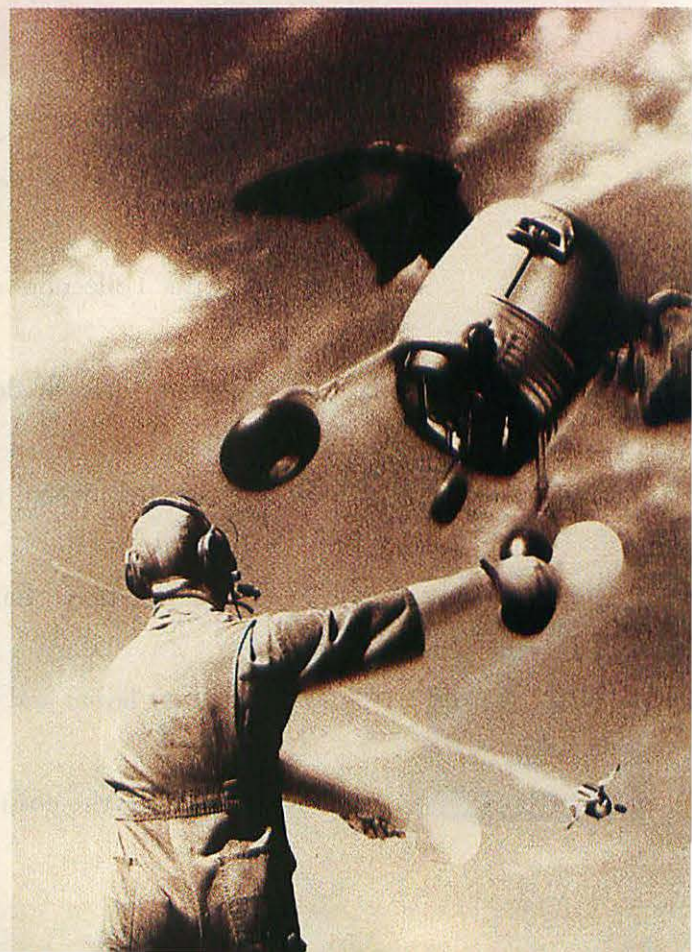
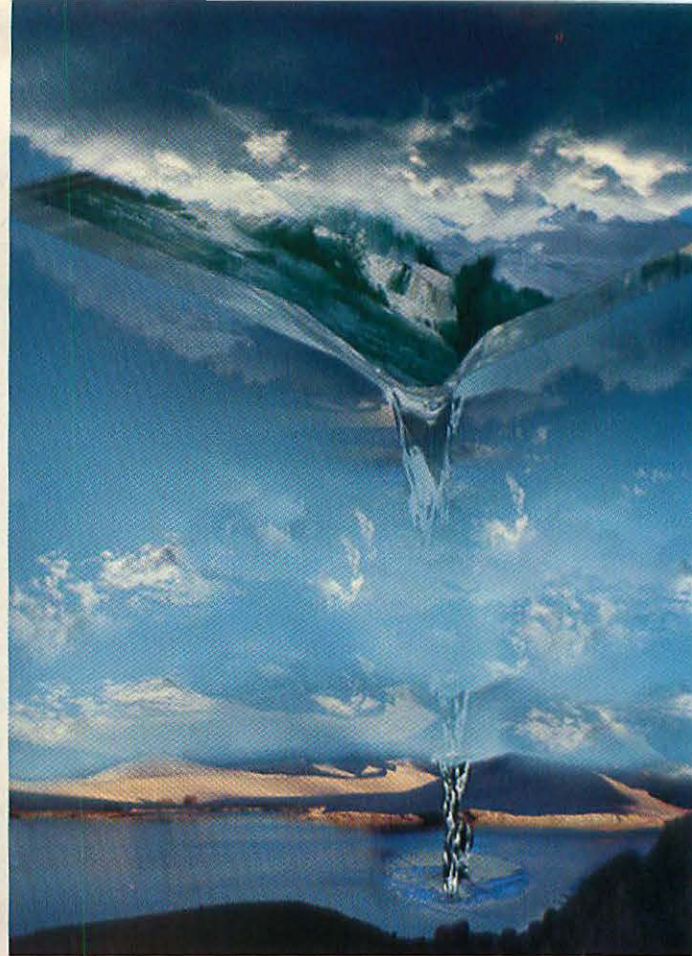
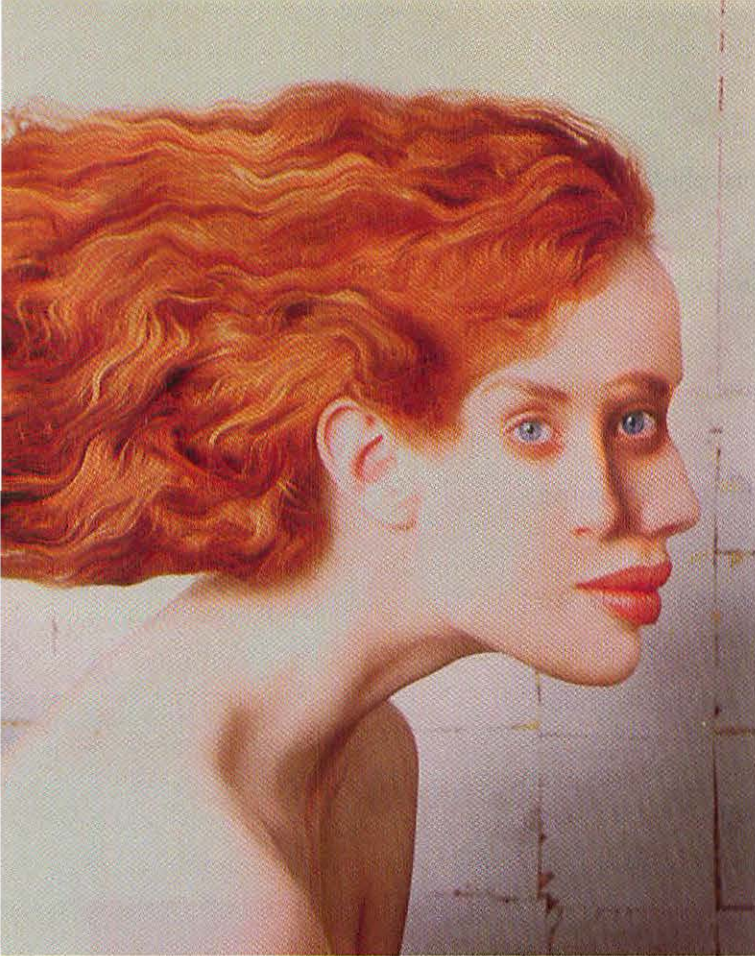
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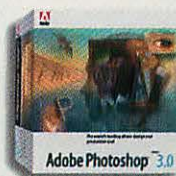
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walk hard

BY DAVID LILLARD

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on PAGEMAKER 6.0.

...k on a Sunday afternoon and you're finally crossing the last item off
...end's "to-do" list. Time to get physical, but the gym or a swim won't
...et outside for a walk—not a stroll around the block, or a neon and
...power push. It's time for rugged walking.

I k t o u g h

...bservant trend-watcher knows that outdoor activity is booming,
...he boomingest activities is the pedestrian style. But what's only
...g noticed is that a majority of the millions of Americans now
...active outdoor lifestyles aren't "doing" anything out there. They're
...they're getting fit and enjoying the great outdoors.
...in the fitness boom and the outdoor recreation craze,
...s slipped the notice of most media," says Robert Hoffman, a
...ks on trail and river protection projects.
...people don't want to climb Kilimanjaro or strap walking weights to
...but they want to be outdoors after spending the better part of their
...ek stuck in an office or other indoor setting," says Hoffman. "A
...rugged walk in the outdoors restores mental and
...ritual energy in a way that counting laps on a track or
...steps on a treadmill just can't compare."

> What's more, rugged walking, by definition, removes the
...specter of competition that typifies most newer
...forms of outdoor activity. For instance,
...rock climbing and mountain bicycling,
...two of the hottest recent
...entries into the outdoor arena, are
...about accomplishing bigger and
...bigger challenges—a smoother rock face, a
...er ride. No knock against these adventurous sports, but for them it's
...ment that drives the activity. For the rugged walker, the
...one in the same. Challenging terrain is embraced and enjoyed,
...o requirement.
...ly, is rugged walking, and what's making it so popular? Two words

Mike Salisbury uses Adobe™ PageMaker™ to create designs so powerful they've become part of our collective consciousness. Layouts for Rolling Stone magazine, posters for Jurassic Park and Aliens, and Michael Jackson album covers bear his imprint. Now there's a radically new Adobe PageMaker 6.0 upgrade. "The interface is so natural, it never interferes with my ideas", says Salisbury, "and this new version is really over the top. I'm getting dead-on color from start to finish because it's locked into Kodak's Precision Color Management System." Hot new features include multiple master pages to streamline the creation of different page designs in a single publication; grouping and ungrouping to combine elements into a single movable, editable unit; integrated automatic trapping for color publications; and full compatibility with Adobe Acrobat™ and HTML so any document can be sent anywhere electronically. Adobe PageMaker 6.0 is here, so even if you're not creating professional design, this is the tool to give you professional looking results. Call 1-800-521-1976, Ext. K1272 for more information or visit our web site at <http://www.adobe.com/>.



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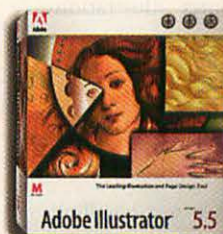


Here's what's going on in our head. Pencil sketch is scanned into Adobe Illustrator. Rainbow color effect ❶ is created with Linear Gradient. Scanned eye ❷ is colorized in Photoshop to simulate a sunglass effect. Grid of green & black in the other lens ❸ is altered with Twirl filter. Circles are added to the bottom of the letter "A" ❹, Pathfinder filter unites them. Letter is imported into Adobe Dimensions™ which adds perspective. Brush stroke ❺ is created with the Calligraphy tool and then painted with multi-color Gradient. The spreadsheet chart ❻ is converted into an Acrobat PDF file and imported. Light bulb glow ❼ is achieved with Shape Blending tool. Punk filter creates spikes ❽ on globe. Entire ad was created and spell checked using Adobe Illustrator 5.5.

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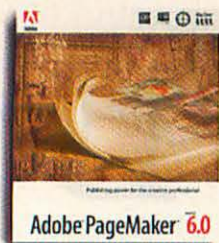


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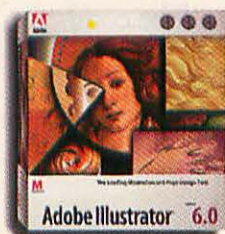
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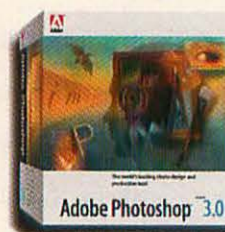


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BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

FORGET THE FILE SWAPPING OR SPECIAL software that used to be involved in using multiple Scrapbook files. As Jolin M. Warren of Chevy Chase, Maryland, pointed out, the Scrapbook program that comes with System 7.5 makes it almost as easy to open Scrapbook files as it is to open SimpleText files. That's because the Scrapbook is no longer a desk accessory. As a result you can open a Scrapbook file by double-clicking its icon, choosing it from the Apple menu, and so on. However, the Scrapbook application can open only one file at a time.

For quick access to your Scrapbook collection, create a Scrapbooks submenu in your Apple menu by placing a folder named Scrapbooks in the Apple Menu Items folder and putting your descriptively named Scrapbook files or their aliases in the Scrapbooks folder. If you use System 7's file sharing on a network, you can even include an alias of a Scrapbook file from another networked Mac. When you open that alias, your Scrapbook opens the other Mac's Scrapbook file over the network. To make a new Scrapbook file, remove the file named Scrapbook File from your System Folder and open the Scrapbook. It automatically creates a new file named Scrapbook File, which you can rename and move anywhere.

To open two Scrapbooks—for example, to drag items from one to the other—make a copy of the Scrapbook application. Open one Scrapbook file as previously described and open the other by dragging and dropping its icon onto the duplicate Scrapbook application.

These techniques work the same way with Note Pad 7.5 and Note Pad files.

Sleeping Desktop Machines

Q. Is there any software that will put my Power Mac 6100 to sleep overnight (like a PowerBook) so I can

avoid the lengthy System 7.5 start-up process every morning? I also want to save wear and tear—especially on the hard drive.

*Paul Jackson
Kirkland, Washington*

A. The shareware control panel **Sleeper** spins down hard drives and dims the display after periods of inactivity on a desktop Mac (see "Sleeper"). You can use **Sleeper**'s screen dimming in conjunction with another control panel that



reduces power on an Energy Star monitor, such as Apple's Energy Saver control panel, and you can have **Sleeper** bring up a screen saver, such as After Dark, instead of dimming the display. **Sleeper** does not affect IDE drives, CD-ROM drives, tape drives, or the CPU and other system-board circuitry, all of which remain fully active. **Sleeper** is available from the Macworld Online forums of America Online and eWorld and from St. Clair Software (fax 412/835-4402).

Change Printers without Chooser

Q. Is there a quick way to switch between our two printers without going into the Chooser every time?

*Carl A. Schell
Phoenix, Arizona*

A. You have lots of options. If you have **QuicKeys**, you can define some very simple macros for changing printers. Each macro must contain a Choosy extension that you set up to choose one of your printers, as described in the **QuicKeys** reference manual. Launching one of these macros quickly chooses a printer.

Instead of using **QuicKeys** you can install Apple's Desktop PrintMonitor software, which brings desktop printer icons to System 7.1. You create desktop icons for printers with the Chooser. To change printers you simply select a desktop printer icon and choose Set Default Printer from the Printing menu that Desktop PrintMonitor adds to the Finder. Alternatively you can choose a printer and print a document by dragging the document's icon to the printer's

icon. Double-clicking a printer's desktop icon opens a window in which you can see and control the print jobs you have waiting for that one printer; this function makes PrintMonitor obsolete (a moment of silence, please). In that window, you can place jobs on hold and change priorities. You can also drag print jobs from one printer's window to another desktop printer of the same type. Desktop PrintMonitor works with the same printer

continues

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driver software as the old PrintMonitor—software such as LaserWriter driver versions 7.X and 8.X, the LaserWriter 300 driver (for Apple's QuickDraw LaserWriters), and the various StyleWriter drivers. Desktop PrintMonitor is available from Apple's Software Update libraries on eWorld and the Internet (<ftp://info.apple.com> or <ftp://support.apple.com>).

You can get all the printing enhancements of Desktop PrintMonitor plus significantly more flexible Print and Page Setup commands and advanced font technology by installing QuickDraw GX, which comes with System 7.5. However, only a few applications support GX's printing and font capabilities. Furthermore, QuickDraw GX requires about 4MB more hard drive space (6MB on a Power Mac) and about 1600K more RAM (2400K on a Power Mac).

As an alternative to QuickDraw GX and Apple's Desktop PrintMonitor software, there are also a number of shareware control panels and extensions designed to bypass the Chooser. The best one I've found is PrintChoice 1.4 by Kerry Clendinning (available from Macworld Online). You can choose a printer from the Printer menu it adds to the menu bar, and you can use PrintChoice to create desktop printer icons for drag-and-drop printing. Print-queue management is still courtesy of the old PrintMonitor.

Rounding by Format

TIP Users of financial spreadsheets often need to display numbers to the nearest thousand. You can do this with the Round function in Microsoft Excel and most other spreadsheet programs, but the programs then use the rounded values in all calculations that reference the rounded cells. If you want to use the unrounded values in calculations,

you can use a custom Excel format to round just the displayed values. "Custom Numeric Formats" shows some examples.

Shane Devenshire
Walnut Creek, California

Efficient ARA Printing

TIP Printing to a distant network printer through an ARA (Apple Remote Access) modem connection can wreak havoc with your system's performance, not to mention running up your phone bill if it's a long-distance connection. You can cut connection time 80 to 90 percent by off-loading print jobs to the ARA server. Off-loaded documents also print faster—because the printer gets them through a LocalTalk or Ethernet connection to the server instead of an ARA connection to your Mac—freeing the printer sooner for other users.

To make all this happen, just replace the PrintMonitor Documents folder in your System Folder with an alias of the PrintMonitor Documents folder on the server. (If you don't have access to the server's System Folder, ask the owner to make the alias and

place it in a folder to which you do have access, so you can copy the alias to your System Folder.) Just make sure the alias has exactly the same name as the folder it replaces, and the server has all the fonts used in the documents you plan to print. Now you're ready. While disconnected from the server, choose the remote printer [use QuickKeys or PrintChoice as described earlier in "Change Printers without Chooser"] and print your documents. As your system begins spooling files for background printing, ARA automatically connects to the remote server

continues

A	B	C	D	E
Unformatted	Format1	Format2	Format3	Format4
1234	1	1000	1,000	1,000
123		000	0	0
234		000	0	0
565	1	1000	1,000	1,000
123456	123	123000	123,000	123,000
1234567	1235	1235000	1,235,000	1,235,000
-1234	-1	-1000	-0	(1,000)
-123		000	-0	0
-234		000	-0	0
-565	-1	-1000	-0	(1,000)
-123456	-123	-123000	-0	(123,000)
-1234567	-1235	-1235000	-0	(1,235,000)
Format1	###			
Format2	###, "000"			
Format3	[<500]"0",###,###,"000"			
Format4	[<0]###,###,"000"0"[<500]"0",###,###,"000"			

Custom Numeric Formats To display rounded numbers in Excel without affecting the underlying values used in calculations, use custom number formats like the four shown here.

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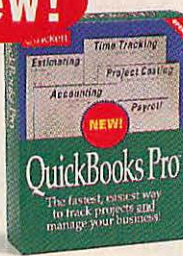
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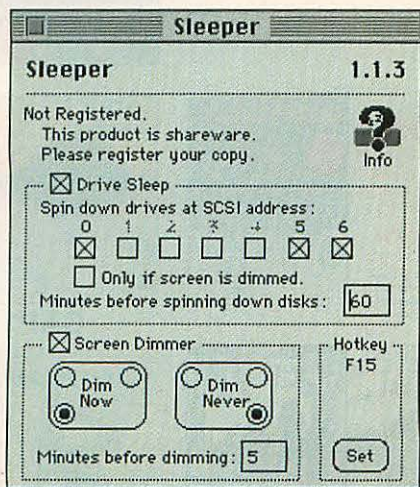
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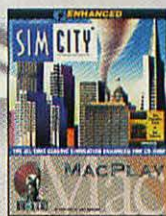
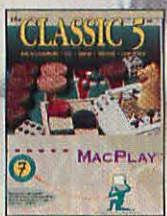
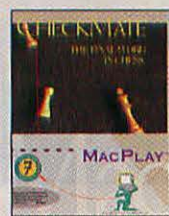
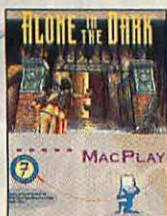
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Sleeper This shareware control panel lets you set sleep options for a desktop Mac.



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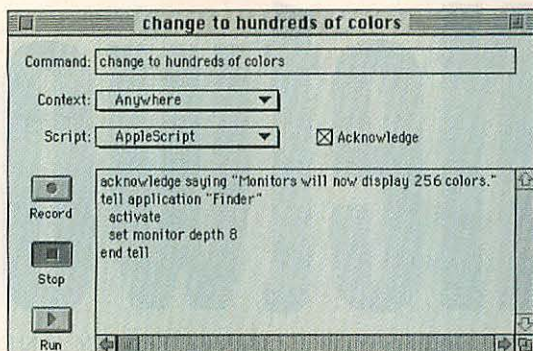
and dumps the spool files into the server's PrintMonitor Documents folder. You can now disconnect from the server. The server's PrintMonitor application opens automatically and sends the spool files over the local network to the printer. If you want to use your local printer, drag the alias of the server's PrintMonitor Documents folder out of your System Folder, choose your local printer, and print.

If long-distance phone charges aren't a concern and you don't want the hassle of replacing the PrintMonitor Documents folder and the alias, you can still avoid working during the slowdown caused by background printing through an ARA connection. The trick is to accumulate a batch of background printing jobs before making the ARA connection. While disconnected from the ARA server, choose the remote printer [use QuickKeys or PrintChoice] and print. Your system spools the background printing job in your PrintMonitor Documents folder, and soon your PrintMonitor application opens automatically and tries to send the job to the remote printer. PrintMonitor notifies you, usually with an alert box, that there's a printing problem (it can't find the remote printer because you're not connected to the ARA server). Click OK to dismiss the alert box, but ignore the pseudo problem and continue "printing" additional documents. PrintMonitor will not interrupt you again. Do not open PrintMonitor until all your documents are spooled and you have made your ARA connection. Then choose PrintMonitor from the Applications menu and click Try Again in the alert box that appears. Take a break and let 'em rip!

*Komra Moriko
Greenfield, California*

To keep PrintMonitor from complaining about missing printers, open it (it's in the Extensions folder) and choose Stop Printing from its File menu. When you've made your ARA connection, open PrintMonitor again and choose Resume Printing.

Installing Apple's Desktop PrintMonitor software makes batch printing very simple. Before printing, you select the remote printer's desktop icon and choose Stop Print Queue from the Printing menu in the Finder. When you're ready to print the queued batch, you make your ARA connection, select the remote printer's desktop icon, and choose Start Print Queue from the Printing menu. Alas, your ARA printing tips don't work with Desktop PrintMonitor installed, because it won't let you use one Mac's desktop printer icon from another Mac.—L.P.



Colors by Voice This speech macro sets the Monitors control panel to 256 colors. For thousands of colors, change *hundreds* to *thousands* in the Command field, 256 to *thousands* in the first script line, and 8 to 16 in the penultimate script line. For millions of colors, change *hundreds* and 256 to *millions*, and in place of 8 put (max monitor depth).

Monitor Depth at Your Command

TIP If you use voice recognition and System 7.5, or a later version, on your Power Mac, 840AV, or 660AV, you can set the monitor depth (number of colors or grays) in the Monitors control panel by voice command. All you need to do is create a few simple speech macros, one for each depth you use. Start by opening System 7.5's Speech Macro Editor program (in the Apple Extras folder under Speech Technology). For each macro, use

the Create New Macro command to open a macro editing window, set up the macro as shown in "Colors by Voice," and close the editing window. A warning may appear suggesting the voice recognizer may not understand the command you entered when you speak it later. I've had good luck ignoring this and clicking OK to dismiss it. Create as many macro variants as you need to set the monitor depths you use. Choose Save from the File menu to save the speech macros file and make the new voice commands available.

"Computer, Earl Grey, hot!" Oh well, I haven't quite got that worked out yet.

*Brian Lloyd
Medicine Hat, Alberta, Canada*

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses. ■

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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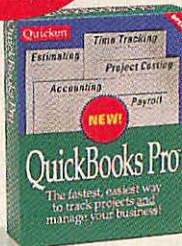
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Job 7	1,000.00	1,000.00	1,000.00	100%
Job 8	1,000.00	1,000.00	1,000.00	100%
Job 9	1,000.00	1,000.00	1,000.00	100%
Job 10	1,000.00	1,000.00	1,000.00	100%
Job 11	1,000.00	1,000.00	1,000.00	100%
Job 12	1,000.00	1,000.00	1,000.00	100%
Job 13	1,000.00	1,000.00	1,000.00	100%
Job 14	1,000.00	1,000.00	1,000.00	100%
Job 15	1,000.00	1,000.00	1,000.00	100%
Job 16	1,000.00	1,000.00	1,000.00	100%
Job 17	1,000.00	1,000.00	1,000.00	100%
Job 18	1,000.00	1,000.00	1,000.00	100%
Job 19	1,000.00	1,000.00	1,000.00	100%
Job 20	1,000.00	1,000.00	1,000.00	100%
Job 21	1,000.00	1,000.00	1,000.00	100%
Job 22	1,000.00	1,000.00	1,000.00	100%
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The Telephone Connection

COMPUTER/TELEPHONE INTEGRATION (CTI), one of the hottest technologies being considered by network managers today, links a PBX (private branch exchange) and a personal computer or server together to enhance productivity. CTI allows employees to control voice mail on their computers, for example, or call in remotely via phone to hear E-mail. CTI's potential applications make it appealing—in theory—but competing standards and high implementation costs are preventing most managers from taking the plunge.

The battling standards involve two application-programming interfaces. In one corner is TAPI, developed by Microsoft and Intel, which assumes a direct connection between your phone and the computer on your desktop. In the other corner is TSAPI, developed by Novell and AT&T, which insists that your server and PBX first talk to each other and then communicate with individual computers and phones. To further muddy the waters, Nortel, also known as Northern Telecom, has developed a protocol called Tmap to allow TAPI-compliant applications on a desktop computer to communicate with TSAPI-compliant applications on a server. Each standard has a coterie of roughly 100 developers who have committed to creating products based on their chosen standard, but few TAPI applications are shipping, compared with 40 shipping TSAPI applications. Apple has weighed in on the side of TSAPI by helping establish the Versit consortium with AT&T, IBM, Siemens Rolm, and Novell (for more on Versit, see "Dial M for Macintosh," *At Work* news, in this issue).

Whether you go with TAPI or TSAPI, expect serious expense when upgrading for CTI. You'll need boards for PC-to-PBX or server-to-PBX con-

nections, upgraded storage for desktop machines and servers (since incoming and outgoing recordings take up more space than data does), and possibly even new telephones. The cost of the applications won't be cheap either, especially on the server, where Novell is charging hefty licensing fees for TSAPI-based applications. You'll also have to upgrade the software on your PBX as well as add boards that connect to the server or the desktop machine. Depending on the number of lines you need, you may have to spend hundreds of dollars per connection.

When CTI finally coalesces, you can expect lower costs. Until then, the ringing in your ears may just be the sound of your vendors' cash registers.

—MATTHEW LEEDS



HEIDI MERSCHER

ISDN Tops the Charts

A RECENT RASH OF ISDN-RELATED acquisitions by Shiva, Xylogics, Xircom, and Microcom (all sellers of remote-access servers) may be a tribute to the growth and importance of high-speed ISDN connections, along with the value—at least to some of the companies—of a global presence.

Shiva's purchase of Spider Systems, for example, will allow Shiva to provide cost-effective ISDN-management products, according to the company (617/270-8300). The British company Spider also offers dial-up routing, X.25, and frame-

relay technologies. (In another business move, Shiva has announced a partnership with Nortel to develop products and services for Internet service providers and remote dial-up switching customers.)

Xylogics (617/272-8140) recently acquired Scorpion Logic, a British developer of intelligent-ISDN-on-demand routing systems, and its Infinite Networks subsidiary. This purchase will allow Xylogics to sell Scorpion's CLAM, a personal ISDN router, and Marlin, an ISDN central-site remote-access server, by early fall.

Meanwhile Xircom (805/376-9300) has bought Primary Rate, now known as the Xircom ISDN Technology Group, for its client and server software and core ISDN technology.

Microcom (617/551-1000) has purchased the ISDN product line of a German subsidiary of Electronic Data Sys-

tems to create Microcom GmbH, a German company whose technologies can be adapted to Microcom's LANexpress remote-LAN-access server and other Microcom products.

Product support for ISDN is growing, along with availability. Rockwell Network Systems (805/968-4262), for example, offers the NetHopper NH-BRI line of remote-access products, which are designed to lower ISDN charges. Prices range from \$1495 to \$2795. Sonic Systems (408/736-1900) launched its first remote-access server, the \$999 three-port QuickStream/3, in June; an ISDN version is due out by the end of the year. Tribe Computer Works (510/814-3900) will add ISDN support to its two-port TribeLink2 server via a daughtercard by November. No prices had been set for either server at press time.

—DEBORAH BRANSCUM

CE Software Bullish on QuickMail

WHEN APPLE STARTED PLANNING to integrate E-mail services directly into the Mac OS, most Macintosh E-mail developers thought they were living on borrowed time. But Apple's effort—PowerTalk—has proven fat and inept, and CE Software (515/221-1801), the leading Mac E-mail vendor, is feeling its oats. The company plans to ship QuickMail 3.5 by September and publicized an aggressive game plan to release QuickMail 4.0 in the spring of 1996. At the core of upcoming releases will be an increasingly object-oriented code base. This strategy won't be immediately obvious to end users, but it should mean quicker, more stable releases.

QuickMail 3.5 shifts some MailManager duties to a newly written Power Mac-native server module; the server-based MailManager can reply to, forward, and delete messages based on user-defined criteria. Also on the server side, administrators can set minimum password lengths, set time-limited passwords, and require both letters and numbers in passwords. QuickMail 3.5 administrators will also be able to delete old messages and mail-log entries, giving them greater control over server resources, and CE has added direct Internet E-mail access with Inter-Call, a UUCP mail gateway that supports

MIME enclosures and provides access to Usenet newsgroups. Version 3.5 also has a gateway for transferring messages directly to America Online.

On the client side, version 3.5 supports drag and drop, both within the application and from other applications, and text styles (color, size, fonts, and attributes). Also, the enclosure dialog box is no longer modal, giving users more flex-



DOUG ROSS

ibility as they create their messages. For remote users, CE has created a new folder hierarchy on the client machine, so that users can access their filed mail over ARA. With 3.5, QuickConference becomes a separate application with less-intrusive notification options and a reduced drain on network bandwidth.

IN BRIEF

■ **Picking Apart Fast Ethernet** Network managers can now examine 100BaseTX Fast Ethernet packets using EtherPeek 2.05, a software protocol analyzer from The AG Group (510/937-7900). The release is free to registered users. A PCI-compatible, native Power Mac upgrade to version 2.2 is due this fall (\$175 for 1.X owners and \$75 for 2.X owners). The AG Group has also launched a new Internet network-troubleshooting discussion group; send E-mail to jon@aggroup.com for details.

■ **AppleTalk Diagnostics** Neon Software (510/283-9771) has added six new reports to RouterCheck 3.0, for diagnosing problems on AppleTalk networks. Now RouterCheck reveals local default zone configurations, local default network numbers, routing tables, local zone configurations on a per-network basis, zones assigned to a specific network number, and misconfigured zone lists. The \$669 program also has new AppleScript support and increased support for Apple events.

Next up will be QuickMail 3.7. This update will focus on remote and mobile users, eliminating the specialized remote client software, adding automatic compression and decompression of messages, and adding a Power Mac-native telecom server supporting multiple connections and TCP/IP access.

In spring 1996 CE plans to ship QuickMail 4.0, which will include tools for monitoring network usage and setting limits on file sizes and maximum mail usage. Version 4.0 will also support multiple public folders; TCP/IP on the Windows client; and new mail forms with color, additional fields, and support for standard graphics formats.

In related E-mail news, Lotus (617/577-5800) has announced that the next version of the cc:Mail client (7.0, due in the second half of 1995) will support Microsoft's messaging API (MAPI) and that the next release of Lotus Notes (4.0, also due in the second half of 1995) will use the cc:Mail user interface for E-mail. The company is also developing server software that will let cc:Mail clients connect over the World Wide Web.

—CAMERON CROTTY



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BY CARY LU

PowerBook Notes

Fax on the Go

IF YOU HAVE A POWERBOOK, YOU PROBABLY have a modem that can send data or fax images. In the past, I've discussed data modems; this time I take up fax.

Although fax technology goes back well over a century, it really caught on only after the adoption of the Group III fax standard in 1980. But whereas computers are designed to work with files, a fax device is essentially a remote copier. You cannot electronically edit the text in a fax image; all you can do is look at it—on screen or on paper. In most cases, electronic mail and file transfers are far superior to faxes because you can store and edit them. But because it's easy and follows a single worldwide standard, faxing is popular; there are no file formats or computer-platform issues to fuss with.

Fax Software

Which fax software should you use? For typical text documents, all fax programs produce similar output; the main differences involve operational features. So you might as well try the program that came with your modem. If you find that unsuitable and want an alternative, my first choice is Delrina Fax Pro (\$90, 416/441-3676); for more information on fax software, see *The Desktop Critic*, *Macworld*, October 1994. Global Village recently added gray-scale output with GlobalFax 2.5, and Supra promises gray-scale capability in a forthcoming version of its Faxcilitate. For faxes, gray scale means a dithering or halftone algorithm; the results are serviceable but far from elegant.

Even with gray scale every fax program, save one, treats the remote fax machine as a QuickDraw printer. UltraScript MacFax (\$99; Pacific Rim Data Sciences, 510/226-8930) turns fax machines (as well as Apple StyleWriter and HP DeskWriter printers) into PostScript printers, producing not only halftone gray scale, but also drawings, rotated text, and other printing effects not possible with QuickDraw. UltraScript MacFax comes in two parts: the PostScript rasterizing

program (UltraScript Mac) and a faxing program (SwitchBox). Together they need 3MB of RAM to send faxes from an application. Although it works effectively, UltraScript MacFax is hard to set up and use; you'll still want to keep other fax software installed for routine faxing. When using MacFax, don't forget to set Color/Grayscale in the printing options.



Fax Formats

The Group III protocol supports any kind of digital data, provided that the fax devices at both ends of the connection can handle the data type.

- A fax bitmap image is by far the most common data type, understood by all fax devices. The standard fax image is a bitmap, 203 dpi horizontally by 98 dpi vertically. A fine-mode image is 203 by 196 dpi, which is much better in quality but takes longer to transmit. (The extra-fine or superfine mode offered by some fax machines—203 by 391 dpi—is proprietary to a specific brand of fax machine. No fax modem supports this mode.)

- Editable computer files can be sent from one fax modem to another with the Group III protocol using the Binary File Transfer (BFT) format. BFT is support-

ed by a few Windows fax programs and should be available in Mac fax software by the end of the year. You should not send BFT files unless you know your recipient can read the format.

InfoImaging Technologies (415/960-0100) takes a different route to file transfer. Its \$99 3D Fax software (available now for Windows; the Mac version is due this year) converts a file into a dense checkerboard image for sending to an ordinary fax machine. The recipient must capture the image with a scanner and then use the 3D Fax software to reconstruct the original file from the scan. Each printed 3D Fax page holds 16K, and you must scan original checkerboard pages printed directly by a fax machine. Refaxing the image—running it through a fax machine—distorts the image and makes it unreadable. A 40K-per-page mode is available for fax modem-to-fax modem connections that involve neither fax paper nor a scanner (a method similar to BFT). The 3D Fax paper method is a very clumsy way to send a file; no one would use it if they had electronic mail or the BFT format available. But InfoImaging argues that for now, fax machines are more widespread than E-mail connections.

Connection Problems

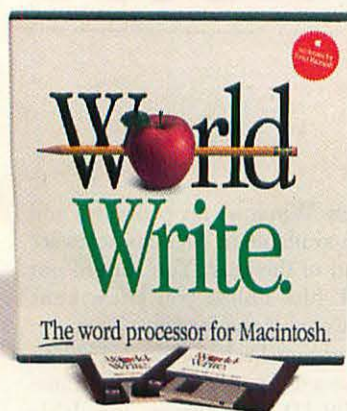
A fairly common problem encountered in sending to a fax machine is the failure to connect. Typically you can hear the remote fax machine answer your fax modem, but during the handshaking process, the modem and the fax machine disconnect. Calling again or using a different phone line doesn't help. Sometimes the problem is that your fax modem is trying to send at 14,400 bps, but the receiving fax machine runs only at 9600 bps; the two fax devices should adjust speeds automatically, but sometimes the adjustment fails. You can fix this problem by setting your fax modem to send at 9600 bps rather than at 14,400 bps.

If after you've manually adjusted the

continues

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speed your fax modem still fails to connect, it may simply be incompatible with the remote fax machine. You can either print a copy of your document and use a fax machine for sending, or send the fax via a store-and-forward system—you send the fax to a third fax device, which then calls the destination fax machine. Store-and-forward also helps out when the fax number is busy and you don't have the time to keep redialing.

Receiving a fax when you're traveling is another challenge. If the fax has to go through a hotel switchboard, both sender and receiver must know how to send a fax manually. On the send side, this merely consists of calling with the handset on the fax machine and waiting to press the Send button when the receiving fax modem responds. On the receive side, you must have a telephone on the same line as your fax modem; select manual receive when you're ready to start receiving. In manual-receive mode, the fax modem immediately sends out an answering signal without waiting for the phone line to ring. Not all fax software offers this option.

Sending and receiving faxes manually is not usually difficult, but be prepared to talk your correspondent through the process—some people have trouble with manual receive on a fax machine. Whatever you do, make sure you do it within 45 seconds, the time allowed under the Group III protocol to make a connection before hanging up. Although some fax programs give you the option of extending that time period, on a fax machine such a change usually requires a service adjustment. But only people who know where you are can send you faxes in this manner. To retrieve faxes sent to your regular fax number, you need a fax mailbox, which stores incoming faxes for remote retrieval.

You can choose from several methods of fax store-and-forward and fax mailboxes. Many companies—mostly smaller ones—offer the service on a subscription basis for roughly \$25 a month and a per-minute usage fee of 15 to 35 cents; check your yellow pages under fax and telephone services. The best way to subscribe is to arrange with your local phone company for automatic rollover of your fax calls to the service; when you travel, simply disconnect your fax machine.

The Fax Friday from Bogen Communications (201/934-8500) combines a digital voice-mail machine with fax store-and-forward and fax mailbox features in a single unit that sells for \$599 or \$799, depending on the amount of fax-page storage. For business use, the Fax Friday needs an uninterruptible power supply for handling slow brownouts.

Some fancy fax machines offer either fax store-and-forward or fax mailboxes or both. Several online services—AOL, CompuServe, eWorld—offer store-and-forward; you send text as an E-mail message, giving the service the destination fax number. The online service converts your E-mail into a plain text document and calls the fax number. No one offers the obvious function you'd expect from an online service: store-and-forward and fax mailbox features through your E-mail connection. Incoming faxes would be delivered as graphics files for downloading; you would send fax image files to the service for forwarding.

Personalizing Faxes

Paper faxes have always offered a personal touch: you can write on the paper before faxing it. But you can personalize a digital fax by scanning your signature; simply fax it to your fax modem and put it in your Scrapbook. You can also send computer faxes in your own handwriting. Signature Software offers Personal Font (\$99.95, 503/386-3221), a service that takes about four weeks to produce a custom-made PostScript font from your handwriting samples. The results look fairly convincing, although the legibility inevitably depends on your handwriting.

You could also carry a scanner for the times you want to fax something that exists only on paper (for a brief survey of portable scanners, see the May 1995 *PowerBook Notes*). But since fax machines are everywhere, carrying a scanner hardly seems worth the bother.

Optical Character Recognition

Most major fax software packages offer optical character recognition (OCR) as a standard or optional feature, but OCR rarely works well on scanned fax images. Even under the best conditions—plain documents printed in Courier and sent in fine mode—the error rate runs 3 to 5 percent. This far exceeds the maximum 1 percent error rate commonly considered tolerable from even the lowest-resolution (300-dpi) flatbed scanners.

The whole idea of doing OCR on a fax seems rather odd since the vast majority of documents sent by fax originated on a computer. If you can get a document via E-mail rather than as a fax, you can avoid all the OCR hassles.

Which brings us back to the irony of fax. It may be a crude format, but it's so easy to use that it will be with us for many years to come. **m**

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.

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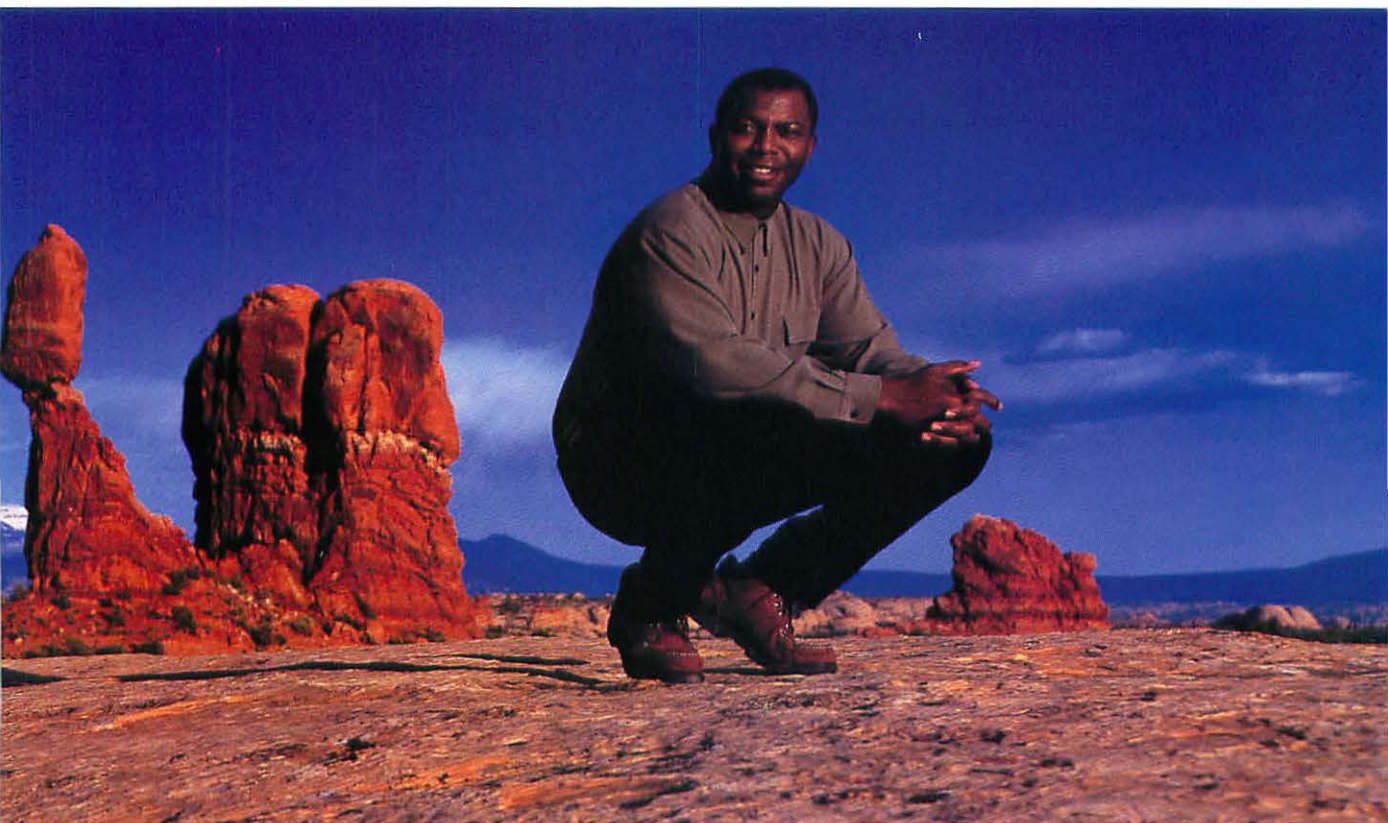
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100 MHz PowerPC 601 RISC processor

Processor upgradable via daughterboard

3 expansion bays

8 DRAM sockets

16MB to 512MB of DRAM


Built-in video-in

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The Online Utility Belt

Online add-ons for the online addict

BY NOW I'M SURE YOU REALIZE that your expenditures don't end when you buy your Mac. In fact, that merely pokes a hole in the dike of your checking account; by the time you buy software, peripherals, and software for the peripherals, you've spent much more than the cost of the Mac itself. Especially if you're online. I have friends who emerge from their beds at 1 p.m., pupils dilated, recoiling from the sunlight, having been up all night exploring the Web. I know people whose America Online payments could retire the federal deficit by 1998. I know one guy who doesn't even laugh out loud anymore; he just mutters the online shorthand, "LOL." This stuff ought to be regulated by the FDA.

Fortunately, as card-carrying cyberholics themselves, the members of America's programming underground have created an amazing wealth of software doodads to make using online services less expensive, less irritating, and more fun. Here are some juicy examples, dedicated to America Online, CompuServe, and eWorld junkies everywhere. (For extra-special irony: to get most of these programs, you must go online—for example, to the Macworld areas of AOL or eWorld.)

XTimer 1.5

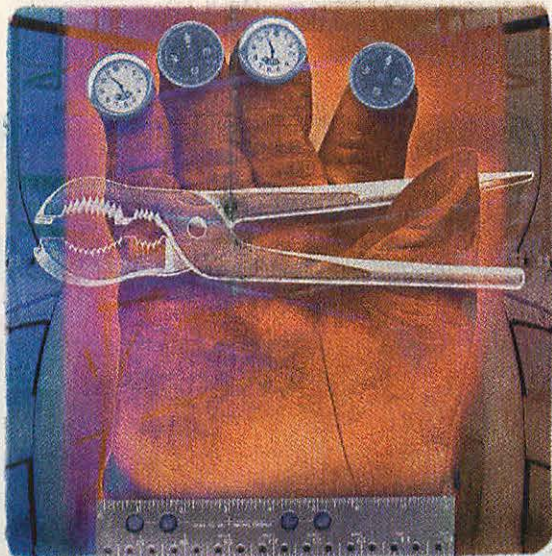
XTimer is a \$10 shareware item by Eric Long. It's a little floating window that ticks away the time you've been online—and the money it's been costing you. You choose which online service you're using (AOL, Prodigy, and so forth); XTimer calculates the charges automatically. XTimer has bells and whistles for days: a log of your online usage, easily adjustable rate numbers, a quick-pause feature, and so on. Your modem habit will still suck your life away—but now you'll be able to experience it numerically.

ArtValve 2.0

You know what happens when you sign on to America Online for the first time? You click through 43 dialog boxes. You input your credit card, Social Security,

and safe-deposit-box numbers. And 45 minutes later, you finally hear that way-too-cheerful guy say, "Welcome! You've got mail!" Then you sit there, for the remaining 45 minutes before bedtime, waiting for *art* to get downloaded—wave after wave of on-screen graphics that the AOL computers deem necessary to force-feed us over the modem.

Now, don't get me wrong: those happy, clickable on-screen icons make AOL great. But for heaven's sake, if you click on some icon—I don't know, Today's Tractors Online—and realize this particular service requires you to wait for 15 full-color screens of artwork, you should be allowed to decline.



Now you can. Bill Karsh's \$5 shareware control panel, ArtValve, tricks AOL and eWorld into believing you already have the necessary art. It does so by slapping a generic AOL or eWorld icon into the appropriate vacant spot on your screen. You can still access whatever features lie behind those icons (by clicking); you just don't get the unwanted art. And if you *do* desire the actual artwork, you can switch ArtValve off in a trice. (Note: it's definitely *not* endorsed by the online services.)

SignatureQuote 1.0

As we've all read in *Time*, if you aren't trendy enough to have an Internet address

on your business card these days, you may as well move to a deserted island. Likewise, once you *are* online, you're instantly branded an amateur if you don't display the proper E-mail netiquette.

For example, if someone writes to you, "How old are you?" you dare not write back, "32." Proper netiquette dictates that you begin your reply by quoting the original question in your reply so your correspondent knows what the heck you're talking about. Netiquette example two: signing your E-mail with nothing but your name is the online equivalent of wearing a "dork" sign on your back. It's far more chic to append a quote from, say, Nietzsche or Beavis and Butt-head to your signoff. For example: "—Bo Derek ('We are the Knights who say Ni!')."

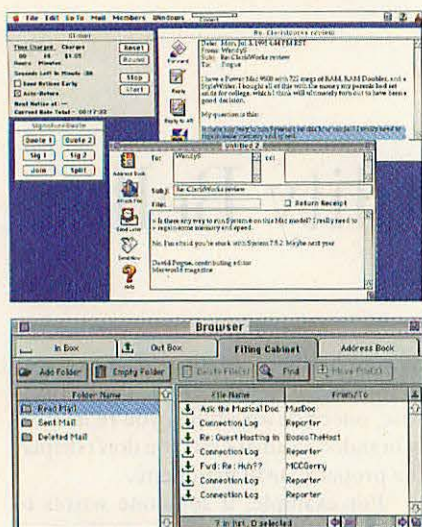
This lightning-fast \$10 shareware program from Rick Holzgrafe handles both of those tasks. First, SignatureQuote automatically puts the proper Internet-style brackets around what you're replying to—and if you're quoting text that was quoted to you, it uses <<double>> brackets. (If the incoming E-mail was one of those Internet messages where the lines break in funny places, SignatureQuote even rejoins the text.) Second, it lets you sign your E-mail with whatever pro-

tracted signature and quote you can dream up—with a single mouse-click. Look like a pro—without the effort.

IM Saver 1.0

Talk about humiliation. Suppose you've got 57 million windows open on AOL (don't you always?). In a fit of cleanliness, you begin pressing ⌘-W (the Close Window keystroke) repeatedly. You hear the telltale *bbrrrring* of an incoming Instant Message (an immediate person-to-person communiqué)—but it's too late! In your frenzy of window closing, you accidentally lost the Instant Message window

continues



Online Lineup Top: XTimer tracks how much of your life is being sucked away online. Below it, SignatureQuote's Quote 1 button automatically formats your reply with the appropriate brackets—and the Sig 1 button signs your E-mail. Bottom: E-mailer is Grand Central E-Mail Station.

forever, even before you had a chance to notice who sent it. For all your would-be conversation partner knows, you're just a snobby jerk, too uppity to reply.

That event is a gaffe of the past if you install this free extension by Joe Zobkiw.

It simply prevents the ⌘-W keystroke (or a QuickKeys macro) from closing an Instant Message window. That's a lot of social security for just 9K of software.

CompuServe Navigator 3.2.1p1

No matter how much you complain about your Mac's slowness, it's still a lot faster than you. That's the premise behind Navigator, the program that automates using CompuServe in the name of saving you money. In a way, Navigator is the precise opposite of CompuServe Information Manager, which is a slow but user-friendly front end to CompuServe; Navigator is speedy and much harder to figure out (\$99.95; CompuServe, 800/848-8199).

By clicking on little tiles and using little menus you preprogram, task by task, your session-to-be. Finally, you choose the Run command. Like some crazed commando SWAT-team software, Navigator furiously dials in to CompuServe, grabs your mail, shoots off your files, whisks away to another forum, summarizes the new messages, and hangs up, panting. Total elapsed time: a minute or two. Now, at your leisure, you play back what happened, reading each E-mail, responding patiently, and selecting messages worth reading, secure in the knowledge that the meter isn't running. (It takes

another frantic Navigator session to send your E-mail responses and retrieve the forum messages you wanted to read.)

Of course, Navigator means an end to serendipity—you never stumble across some online treasure, because you must prescript your every move. In the days before CompuServe's new "simplified" pricing, Navigator could save you tons of money. Today, speed isn't so critical; you pay a monthly fee for a fixed number of hours whether you sign on or not. Navigator is suddenly less relevant. CompuServe junkies, though, may still want to learn Navigator to keep their usage within the number of hours they've bought.

Claris E-mailer 1.0

What a priceless idea: a central program that sends and fetches E-mail to and from AOL, eWorld, CompuServe, the Internet, and RadioMail. Imagine consolidating your various address books, mail-writing interfaces, passwords, and scheduling features into one clean, clever program (\$89; Claris, 408/987-7000). Naturally, you can schedule these E-mail bursts to occur at any hour of any day, with or without you, even in the background.

The program is smart enough to download files attached to incoming

continues

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E-mail. Alas, fonts, styles, and colors get stripped from America Online messages in the crossing. If you can live with that limitation, E-mailer's automatic smarts will save you time, money, and complexity.

QuickKeys 3.0.1

If automating your online sessions (with programs like Navigator and features like FlashSessions) can save you money, then QuickKeys, the leading Macintosh macro program, provides the biggest discount of all (\$119; CE Software, 515/221-1801). Any veteran online user will testify to this truth. For example, the software libraries of AOL are filled with ready-made macros designed to make cyber-surfing ever more convenient.

A few juicy ones: RoomSqueeze, which doggedly tries to break into a chat room until there's room for you; Thread-Saver, which collects a whole message-board's worth of replies into a single text file; and even IM Answering Machine, which automatically sends an "I'm away from the Mac right now" Instant Message to any Instant Message you get while away from the keyboard.

UULite 2.0

I'm all for this business of connecting online services to the Internet. Already

you can send E-mail to people on the Internet—or even on rival online services—without any hassle.

This glorious transparency breaks down, however, if you want to send a *file*, such as a ClarisWorks document, to somebody not on your service. Unfortunately, unlike E-mail, files can't wriggle through to other services. To send them, you must convert them into plain old text.

That's the purpose of UULite: to convert a standard Macintosh file (to *uuencode* it) into pages and pages of coded gobbledygook, which you can paste into an E-mail you're sending (\$29; Jeff Strobel). It's still a royal pain—you have to send multiple E-mails, each containing another few screens' worth of gibberish; and your recipient must reverse the process, feeding all those text files into UULite to reconstitute the file—but it's cheaper than sending FedEx.

(Yes, I realize that DropStuff, the shareware cousin of StuffIt, can encode your files into a similar format called BINHEX—but the resulting text file is too big to paste into an E-mail. UULite at least breaks up the text files for you.)

StuffIt Expander 3.5.2

Virtually every file or program you can download from an online service or the

Internet arrives on your desktop in a specially encoded, compact form. Trouble is, there are about 90 million different formats for file compression; if you don't have the software necessary for expanding what you've downloaded, you get nothing but the "application not found" message when you double-click.

If you are truly an online addict, you already know about this baby: StuffIt Expander, the free, all-purpose file expander. It turns downloaded files with the suffixes .sit, .cpt, and .hqx back into human form; and if you add the companion shareware program DropStuff with Expander Enhancer, it will open .gz, .z, .uu, .ARC, .ZIP, and .uu files, too.

The Upshot

Shareware is a lot cheaper than therapy. With a few of these goodies on your hard drive, you'll see your online-service bills go down, your blood pressure drop, and your sessions become more productive. Hey, maybe you'll even free up some time for more athletic pursuits—like exploring the Web. **m**

Contributing editor DAVID POGUE, pogue@aol.com, is the author of *Mac FAQs [Frequently Asked Questions]* (IDG Books Worldwide, 1995). He is the founder of AOLaholics Anonymous.



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The TrueMotion-S Compressor has an easy-to-use interface that makes working with video completely intuitive. It includes various presets for new users and full, parametric control for experts who want to customize and save

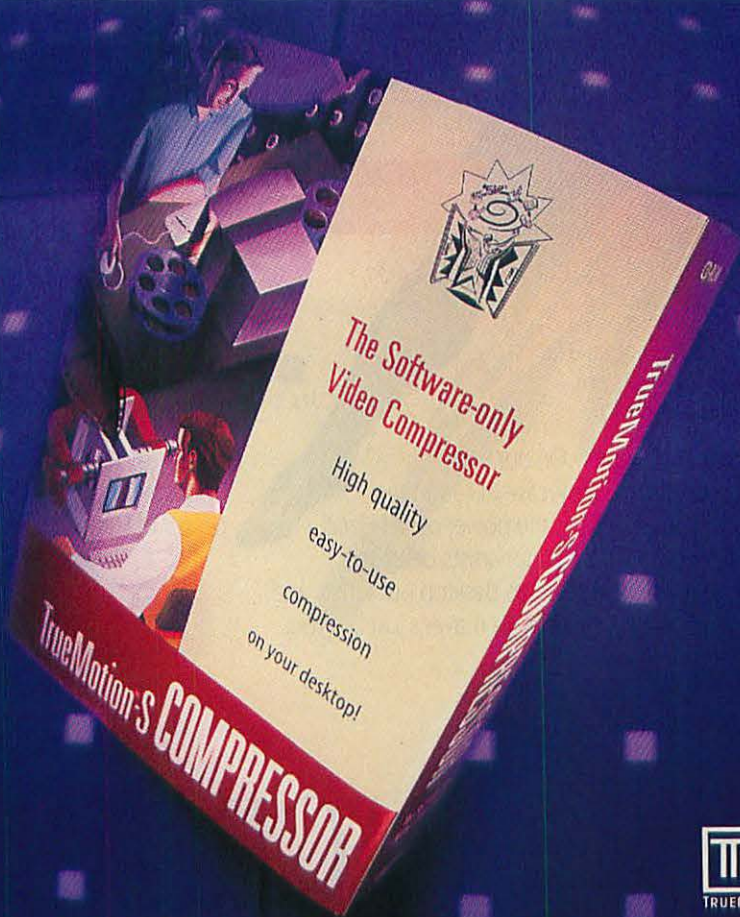
their own settings. It runs under your favorite editing packages, like Adobe Premiere or Microsoft VidEdit. And it lets you produce either MOV or AVI files that can be played back under Video for Windows, QuickTime for Windows, QuickTime, Windows NT, or even Win '95.

The TrueMotion-S Compressor is perfect for CD-ROM title developers, corporate video applications, or other application developers who want high-quality, software-decodable video that can be played at full-screen directly from a 2X CD-ROM on today's computers.

If you want video that's worth watching, call us at 800-828-3808 for a free CD-ROM demo and find out why TrueMotion-S is the only word you need to know.



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Circle 54 on reader service card

Tech Support On Call

How to get tech support without hanging on the line

DOES THIS SCENARIO SOUND familiar? It's Friday morning. You have a presentation to give Monday morning and your latest upgrade is crashing more than a drunken driver on a narrow street. Worse, you've got two more client meetings scheduled and can't afford to spend 30 minutes on hold waiting to chat with the developer's tech-support crew. Time to consider a career move? No, it's just time to go online.

If you're only using your online connection as an electronic mailbox, you're missing one of its biggest advantages. It's also an electronic encyclopedia of Macintosh technical support. Whether you're connected to an online service such as America Online or CompuServe, or you've got a direct Internet connection, you can ask tech-support questions of a multitude of vendors via electronic mail.

Many vendors maintain forums on online services so that customers can easily contact them electronically. It's a good way for vendors to cut down on technical-support staff costs. For users, posting a message on a company forum can be a far more convenient way to get a problem solved. There's no tedious waiting on hold for someone who turns out not to have the right answer immediately at hand. Frequently you'll get a response to your online question in less than 24 hours.

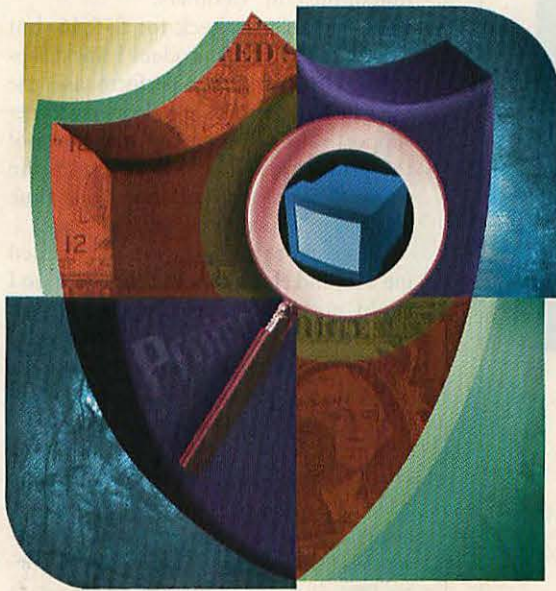
The more information you can deliver up front, the better. You can avoid a lot of back-and-forth questions such as, "What version of the software do you have?" and "What's the scanner's SCSI ID number?" In your initial query describe your problem completely, including the sequence of events preceding whatever is going wrong. Indicate what software or hardware you have installed and any peripherals you have connected.

The Tech-Support Gorilla

CompuServe This service has made its name as a font of technical information. Over 800 vendors and organizations offer product support and information on CompuServe. Head for the Support Directory (click on Computing on the opening screen) to search for forums or ser-

vices focusing on the product in question. CompuServe subscribers can enter search criteria such as company name, company type, product name, product category, operating system, or language. CompuServe's four Mac-specific vendor forums incorporate information from about 70 companies; separate forums cover Newton- and Apple II-related products.

eWorld In contrast to CompuServe, Apple's online service is as Mac-specific as you can get. It features FAQs (frequently asked questions), software updates, and an Ask Apple USA forum for posting tech-support questions. You can also access the Apple Tech Info Library, the database Apple's tech-support staff uses. Want to find out about Unix software for the Lisa or memory upgrades for the Macintosh IIx? The contacts are listed here.



Once you've gone through the Apple material, check Straight to the Source (under Computer Center) for tech-support information for about 100 companies. Note that the Support Information section refers solely to FAQs; for more arcane problems, post your questions in the Product Discussions section.

America Online The fastest-growing of the online services, AOL currently has 17 forums covering topics such as Desktop Publishing, Graphic Arts, Multimedia, and PDAs (click on Computing on the main screen). Each forum contains

software libraries, message boards, and a section labeled Industry Connections, your entry point for tech support. In AOL's Hardware forum, for example, you'll find 40 Mac-related companies offering tech support. Also check out the software libraries for software updates and bug-fixes. The only trouble is, if you can't diagnose your problem, you might not know what file to download to fix it.

Expect to do a little navigating here. You'll find a special resource center for Performas inside the Hardware forum, but Apple II users have a separate forum.

Other Services

GENie This service is divided into numbered Round Tables on topics ranging from pets to medicine to computers. Click on Computing Services on GENie's opening screen to get to the Macintosh Product Support Round Table. There you'll find forums for about 20 companies, where you can leave E-mail messages for their tech-support folks.

Prodigy This family-oriented service sets out exact steps for contacting tech support in its Product Support section (click on Computers on the opening screen). The Computer Support Center icon leads to an explanation about contacting the listed vendors. Only about two dozen are listed there, though, so you're better off going to the Hardware and Software bulletin boards to post questions; you may find other subscribers who can help you out.

The Internet More and more companies are creating home pages on the World Wide Web; you'll find a number of technical manuals on these pages, as well as information on contacting tech-support staff by phone or online. In some cases, you'll also find FAQs, but you're far more likely to find marketing information on the Web than technical support. In the Internet's various comp.sys Usenet groups, you'll find experts happy to help,

continues

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but they're rarely the company's official tech-support reps.

Round-the-Clock Wisdom

Volunteer experts are one of the best aspects of the online services. Besides the official tech-support crews, you'll also find a staggering number of independent enthusiasts and experts who enjoy helping others figure out technology. Just click on the forum or bulletin board you want and post a message. But first scroll through the postings—you may find that your question has already been covered.

Online services and the Internet are available 24 hours a day, so you can search for solutions at your convenience, not someone else's, avoiding the problem of limited tech-support hours and time-zone differences. Think of the online services as a round-the-clock help desk that can help you make your Monday morning deadlines.—HOWARD BALDWIN

Letters

Locked out of SoftKey Last year I received an offer in the mail from SoftKey International of Cambridge, Massachusetts, for KeyCAD Complete, described as a "powerful" CAD program at a "fraction of the cost" of others.

I sent in my check for \$35.46, but when I received the product I was disappointed by its failure to perform tasks the offer had advertised. SoftKey's customer support said the company was aware of the problems and that a fix was in the works. I requested a refund at that time and was told to ship the product back.

Two months later, SoftKey mailed me a refund check that was unsigned, so I could not deposit it. My attempts to receive a replacement check have gone unanswered. I hope to alert your readers to SoftKey's questionable business practices and lack of customer support.

*Brad Cantos
San Francisco, California*

Macworld has heard from two other readers describing similar experiences with SoftKey since November 1994. All three cases involved trouble getting upgrades or refunds from the company. One reader eventually received his upgrade; another received a partial refund. Cantos has still not received his refund. SoftKey representatives have failed to respond to repeated Macworld requests to comment on these readers' complaints.

CAD packages available for the Mac range widely in price, but the least expensive list for around \$300, so KeyCAD's low price should have been a red flag. Still, in this case even checking first with the Better Business Bureau would not have saved Cantos from his bad experience; the Boston bureau has not had a significant number of inquiries about the company and so does not have a Reliability Report

on SoftKey. The sad fact is, if it sounds too good to be true, it probably is.—Joanna Pearlstein

What price knowledge? After an architect demonstrated several CAD programs at my school, I purchased the educational version of ArchiCAD from Graphisoft, but first I contacted the company and inquired about the difference between the full version and the educational version. I was told there was no difference besides the price. Suspicious of this answer, I called a local distributor, asked the same question, and received the same answer.

The program came with a 9-page supplement listing the limitations of the educational version. The biggest omissions were the lack of DXF [a common CAD file-exchange format] and HPGL [for outputting drawings to a DOS-based plotter]. As a student, I had to save for a long time to be able to afford the product, which I hoped to use for my schoolwork. Since I cannot output in any usable formats, I spent over \$500 on a program I cannot use.

*Brett Taylor
Pomona, California*

Macworld forwarded Taylor's letter to David Marlatt, president of Graphisoft. In a response to Taylor, Marlatt expressed surprise at the reseller's failure to distinguish between the two versions of the product but confirmed that the reseller was misinformed. Marlatt offered to refund Taylor's \$495, even though the 30-day warranty period had long ago expired.

Marlatt explained that CAD vendors employ different solutions for the education market: some sell full versions without support or documentation; others rent their software on an annual basis. "Obviously, no formula is perfect for everyone, but based on our hundreds of educational users, we feel that we have found the best solution for most people." (For additional opinions on this subject, visit the Graphisoft forum on America Online. Taylor's posting there generated a lively exchange, with both student and professional architects weighing in.)

Students can get great deals on software—compare \$495 to the \$4995 list price for the full version of ArchiCAD. But first check that the limited version has the capabilities you require. Then try out your purchase as soon as possible. That way, if it doesn't work as you require, you can reclaim your hard-earned cash.—Joanna Pearlstein **m**

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Conspicuous Consumer* department at Macworld, 501 Second St., San Francisco, CA 94107; send us a fax at 415/442-0766; or E-mail us at macworld@macworld.com. Look for us on America Online and eWorld (keyword Macworld) and on the World Wide Web (<http://www.macworld.com>).

Macworld senior editor HOWARD BALDWIN writes frequently about online and Internet issues.

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*PC Magazine, Nov. 22, 1994, Annual Printer Review.

Circle 143 on reader service card

Professional Graphics

Built for the new PCI Power Macintosh computers and the powerful 9500, ATI's XCLAIM GA meets the demands of design



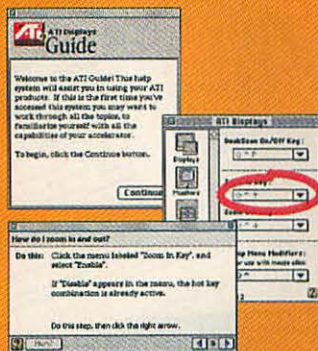
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When Apple wanted the top-of-the-line components for their state-of-the-art computer they chose ATI's graphics accelerators for some of their new PCI Power Macintosh 9500. They chose ATI for our PCI expertise and because we meet the demanding performance requirement of graphics applications.

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Be more productive in your favorite applications. XCLAIM GA performs up to eight times faster¹ than unaccelerated graphics. Display twice the information on-screen with 1600x1200 resolution. And you don't have to compromise speed to get photo-realistic colors.

Application	Scrolling Time / Seconds with Acceleration ON and OFF
Quark Xpress 331 40 pages	26 / 136
FrameMaker 50 pages	37 / 177
Adobe Photoshop 24 bit image*	20 / 169



Amazing Bottom Line

And we saved the best for last. The XCLAIM GA is affordably priced at \$449* for 2MB and \$649* for 4MB versions. The 2MB VRAM memory module upgrade is available for only \$249*

To find out more about this blazing and amazing product call one of the resellers listed below or contact ATI via FaxInfo Line to receive literature (905) 882-2600 Press 2; on CompuServe at GO ATITECH 76004,3656; on the Internet: <http://www.atitech.ca>

Computer Discount Warehouse
1-800-589-4239

DTP Direct
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Mac Connections
1-800-800-1111

Mac Mall
1-800-222-2808

Mac Warehouse
1-800-255-6227

Mac Zone
1-800-248-2088

PrePress Direct
1-800-443-6600

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Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Patricia Carberry-Harris

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld's* comparative articles. A ♦ next to a product indicates that we chose more than one product in that category. A ● next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

17-INCH MONITORS, Oct 95

17B; Philips Consumer Electronics, 800/835-3506; \$899.

SMALL COLOR MONITORS, Jan 94

14-inch display: ♦ Sony CPD 1430; Sony Corp. of America, 800/222-7669; \$779.95.

♦ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; \$799.

15-inch display: NEC MultiSync 4FGc; NEC Technologies, 708/860-9500; company's estimated price \$755.

TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; \$3999.

NETWORK HARDWARE

REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; \$3899 for eight ports.

AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports \$1799, eight ports \$3298.

PRESENTATION HARDWARE

PORTABLE PRESENTERS, Jan 95

Z115; nView, 804/873-1354; \$5495.

PRINTERS

COLOR BUSINESS PRINTERS, Sep 95

Tektronix Phaser 340; Tektronix, 503/682-3411; \$5590.

DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-3777; \$14,995.

Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; company's estimated price

\$20,000.

Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; \$7999.

General publishing and business: Phaser IISDX; Tektronix, 503/682-3777; \$9995.

PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; \$365.

Laser—\$1000 to \$1600: microLaser Pro 600; Texas Instruments, 214/995-6611; \$1599.

WORKGROUP PRINTERS, Jun 95

Tabloid-size printers: LaserJet 4MV; Hewlett-Packard, 208/323-2551; \$3549.

Legal-size printers: ♦ Optra Lx; Lexmark, 606/232-2000; \$3298.

♦ LaserWriter 16/600 PS; Apple Computer, 408/996-1010; company's estimated price \$2299.

SCANNERS/IMAGE CAPTURE

PROFESSIONAL REAL-TIME FILMLESS CAMERAS, Sep 95

Fujix DS-515/Nikon E2; Fuji, 914/789-8100; Nikon, 516/547-4200; \$12,780; with optional lens and PC Card \$14,140.

HIGH-BIT FLATBED COLOR SCANNERS, Mar 95

♦ Arcus II; Agfa, 508/658-5600; \$3495.

♦ PowerLook; Umax, 510/651-8883; \$3495.

LOW-COST COLOR SCANNERS, Nov 93

\$1300 to \$1600: ♦ La Cie Silverscanner II; La Cie, 503/520-9000; \$1599. ♦ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; \$1599.

Under \$1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; \$1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; \$995. ●

SYSTEMS/STORAGE

1.3GB OPTICAL STORAGE, Dec 94

Best low-cost solution: 1.3GiG MO; Club Mac, 714/768-8130; \$2099.

Best overall performance: Genesis 1300; Microtech, 203/468-6223; \$2899.

DOS/WINDOWS CARDS, Sep 95

Most 040 Macs: DOS on Mac; Reply, 408/942-4804; 50MHz model \$590; 66MHz model \$690.

Most Power Macs: OrangePC Model 220; Orange Micro, 714/779-2772; \$1217 direct price.

Occasional Windows Access: Timbuktu; Farallon Computing, 510/814-5100; \$199 per user.

HIGH-PERFORMANCE DRIVE SYSTEMS, Jul 95

Accelerator card: SiliconExpress IV; Atto Technology, 716/691-1999; \$995.

Drive mechanism: IBM UltraStar series; IBM (available from several resellers); prices vary by reseller.

QUAD-SPEED CD-ROM DRIVES, Jun 95

APS T3501; APS Technologies, 816/483-6100; \$299.95.

RAID STORAGE SYSTEMS, Apr 95

RAID 3 or 5: MR/5 RAID; MegaDrive Systems, 310/247-0006; \$18,840.

RAID 0: ♦ Joule RAID; La Cie, 503/520-9000; \$2999. ♦ Diskovery 8200W; Optima Technology, 714/476-0515; \$7790. ♦ SledgeHammer 2000FMF; FWB, 415/474-8055; \$2359.

SYSTEM UPGRADES, Feb 95

Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-1010; \$699.

Upgrade for other 680X0 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; \$1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; \$245. 256K cache card; various companies, roughly \$200.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; \$599.

Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; \$4499.

DIGITAL-VIDEO BOARDS, Aug 95

SpigotPower AV; Radius, 408/434-1010; \$999.

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ♦ MoviePak2 Pro Suite; Raster-ops, 801/785-5750; \$4199. ♦ VideoVision Studio; Radius, 408/434-1010; \$4499.

Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; \$14,995.

Corporate video (online): VideoCube; ImMix, 916/272-9800; \$40,500.
continues

Editors' Choice

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; \$999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; \$199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; \$119.95.

BUSINESS TOOLS

PORTABLE-DOCUMENT SOFTWARE, Apr 95
Document Distribution: Common Ground 1.1; No Hands Software, 415/802-5800; \$189.95.

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; \$595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 312/329-3500; \$895.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); \$30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; \$195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; \$125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; \$199 each.

INTERNET BROWSERS, Oct 95
Netscape Navigator; Netscape Communications, 415/528-2555; \$39.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; \$495 for 5-user license, to \$2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek; AG Group, 510/937-7900; \$795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; \$149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: form2; autodessys, 614/488-9777; \$1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; \$1495.
Entry-level modeler: Infini-D; Specular International,

413/253-3100; \$695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ClickArt Studio Series; T/Maker Company, 415/962-0195; \$99.95 per volume.
♦ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; \$67.50 per month.
♦ Images with Impact series; 3G Graphics, 800/456-0234; \$99.95 to \$129.95 per volume, CD-ROM \$499.
♦ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; \$74.95 per volume, CD-ROM \$149.95.
♦ Typographers' Ornaments; Underground Grammarian, 609/589-6477; \$25 per volume; ten TIFF albums \$200; EPS volumes \$50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; \$49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; \$79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; \$149.95.
Overall: Canvas; Deneba Software, 305/596-5644; \$399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; \$99 (this price includes the ability to unlock two families from preselected packages); an additional \$25 enables you to unlock individual faces, or \$69 to \$179 for unlocking families.
Display/decorative-face collection: Fontek; Letra-set, 201/845-6100; \$39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; \$89 for 57 fonts.

IMAGE DATABASES, Oct 93
♦ Aldus Fetch 1.0; Adobe Systems, 206/628-5739; \$295.
♦ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; \$249.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe Systems, 415/961-4400; \$895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris, 408/727-8227; \$299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288;

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

basic monthly fee \$9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee \$8.95.

ORGANIZATION/PRODUCTIVITY

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; \$195.

SALES-AUTOMATION SOFTWARE, Oct 93
♦ Contact Ease; WestWare, 619/274-5053; one user \$395, five users \$1495.
♦ CBS; Colleague Business Software, 512/345-9964; \$495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; \$129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; \$995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5500; \$495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; \$189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; \$84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; \$149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; \$99.95.
Free software: Disinfectant; free from various online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix, 415/571-5100; \$99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix, 415/571-5100; \$99.

WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95
Microsoft Word 6.0; Microsoft, 206/882-8080; \$325.

LOW-COST WORD PROCESSOR, Mar 95
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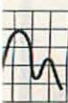
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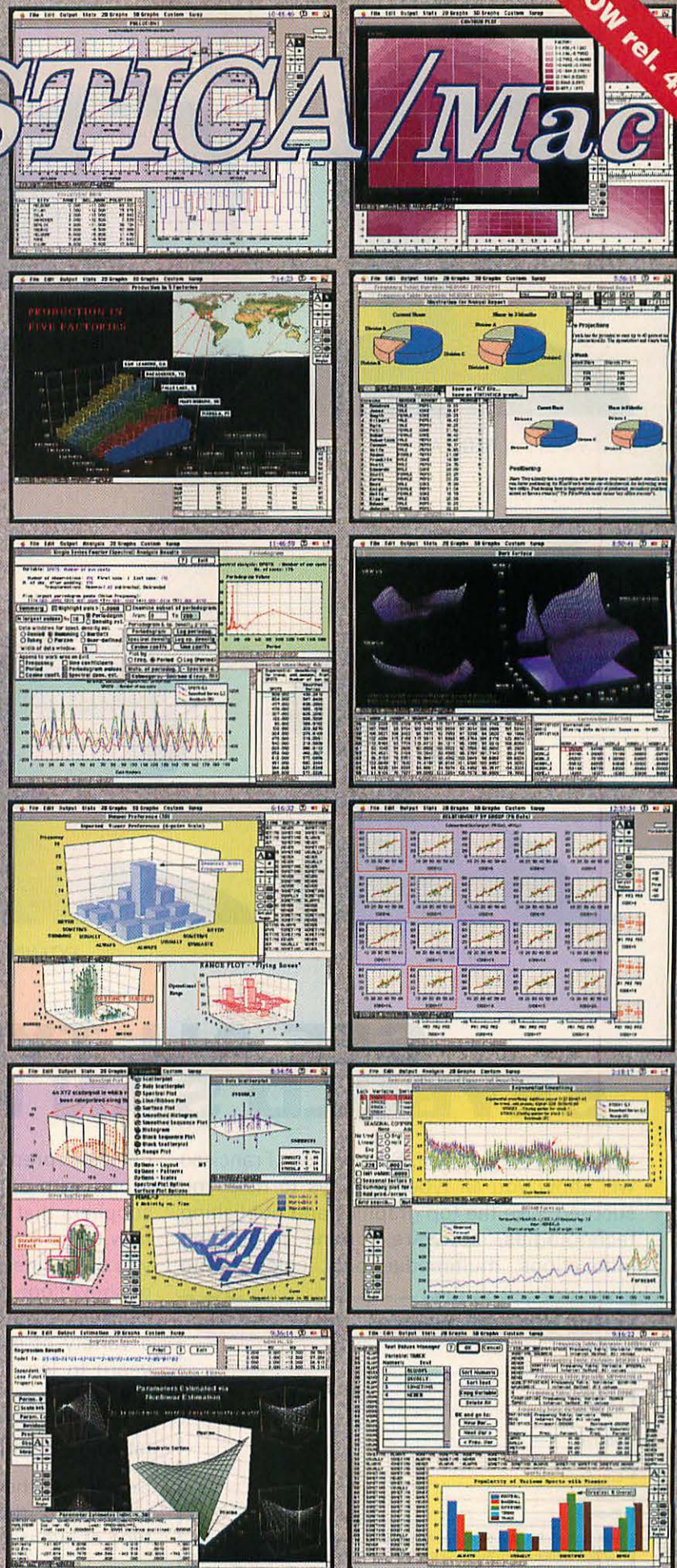


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
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Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

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Software


BUSINESS TOOLS


★★ **Adobe Acrobat 2.0, Adobe Systems, 415/961-4400, \$195.** The font fidelity of this portable-document software is uneven, and the software demands too much in resources compared with other options. Mar 95

★★★ **Adobe Acrobat for Workgroups 2.0, Adobe Systems, 415/961-4400, \$1595.** As a collaboration tool, this software is inexpensive and offers well-done annotation tools. However, it's resource-intensive, and creating hypertext documents with it isn't easy. Mar 95


★★★ **BizPlan Builder 5.0, Jian, 415/254-5600, \$129.** To create a comprehensive business plan, just fill in the blanks in this easy-to-use spreadsheet/word processor template. Jun 95

★★★ **Business Plan Writer 6.0, Graphite Software, 301/984-1100, \$99.** This proposal-writing template can help entrepreneurs create a detailed business plan, but—unlike the competition—it won't help them format an attractive presentation. Jun 95

★★★ **CA-Cricket Graph III 1.52 (1.53), Computer Associates International, 516/342-5224, \$129.** Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94 

★★★★ **ClarisWorks 3.0, Claris Corp., 408/727-8227, \$129.** Inexpensive, easy to use, and powerful integrated software is the best package available. It's far better in terms of features, speed, integration, and use of system resources than its competition. Feb 95 

★★★★ **Decision Analysis 2.5, TreeAge, 617/536-2128, \$379.** Decision-assistance software handles complex business cases by constructing tree diagrams of prob-


abilities and payoffs. It offers a type of modeling that is easy to modify. Nov 94 


★★★★ **Helix Express 3.03, Helix Technologies, 708/465-0242, \$589.** Latest release of this visually oriented database adds speed and features—including conditional branching capabilities and improved forms-drawing tools—without raising RAM requirements. Sep 95


★★★ **InfoDepot 2.0 (2.3), Chena Software, 610/770-1210, \$295.** Project-planning program includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95

★★★★ **MarcoPolo 3.0, Mainstay, 805/484-9400, \$895.** Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batch-process TIFF files with OCR—make it very usable. Jan 95

★★★ **MicMac 2.0v1, Nirvana Research, 408/369-1200, \$89.** The concept of Mac as dictation machine is attractive, and Nirvana has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ **Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, \$339.** Although the feature set of this Power Mac spreadsheet is stunningly rich, the system requirements for a full install are jaw-dropping, including 27MB of hard drive space plus 24MB of RAM without virtual memory. Still, it is relentlessly complete. Jan 95 

★★★★ **Microsoft Works 4.0, Microsoft Corp., 206/882-8080, \$99.95.** Although this isn't the best integrated package around, it's a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95 

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, \$695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94 

★★★ **Phyla 1.0.3, Mainstay, 805/484-9400, \$495.** While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. Aug 95

★★★ **TeamFlow 3.1, CFM, 617/275-5258, \$295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

COMMUNICATIONS/NETWORKS

★★★★ **Apple Mobile Message System, Apple Computer, 408/996-1010, \$549 plus \$19.95 per month.** The medium for your messages can be a PowerBook, Windows notebook, or Newton with this multifaceted remote-messaging service. Keep in touch with a personal 800 number, voice and fax mailboxes, and an Inter-

net E-mail address. Sep 95

★★★★ **ASAP 1.5, MicroBeam, 813/546-2727, \$695; with Windows client program \$795.** File-transfer operations can be a nightmare. Or they can be a dream with this convenient utility. It's easy to set up, and its performance is first-rate. Sep 95

★ **BLAST Professional, BLAST Inc., 919/542-3007, \$139.** Our reviewer could not get this telecom software to work reliably and consistently during his tests, and found the minimalist and quirky interface frustrating. Jan 95

★★★ **CreativePartner, emotion Inc., 415/812-9000, \$1500.** Creative collaboration goes digital with this distribution system for video, sound, text, and graphics. Although the system provides a clever way to send annotations over a network, our reviewer wished for either a higher number of features or a lower price tag. Jul 95


★★★★ **FileWave 2.1.2, Wave Research, 510/704-3900, \$895.** Maintain a central repository of files and distribute application updates to LAN users with this easy-to-use software-distribution tool. Excellent features include file distribution during idle time and the ability to copy-protect transferred files. Jul 95

★★ **HoloGate 1.0, Information Access Technologies, 510/704-0160, \$500.** Two unique features—UUCP and Usenet news distribution—are the primary reasons to consider this product. Otherwise, it comes up price-rich and feature-poor. Apr 95

★★ **The Internet Companion, The Voyager Company, 914/591-5500, \$29.95.** Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it's a terminal-emulation screen. Dec 94

★★★★ **Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, \$29.95 each.** Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ **Internet Membership Kit 1.0 (2.0), Ventana Media, 919/942-0220, \$69.95.** If you need access to the Internet, this book and software combination is a good package. The best part about it is its included preconfigured software. Dec 94

★★★★ **Netscape Navigator, Netscape Communications Corporation, 415/528-2555, \$39.** World Wide Web browser is well ahead of the competition in terms of features, stability, and ease of use. Although its E-mail features could use some improvement, it's the best way to surf the Net. May 95 

★★★★ **NetWorks 3.0.4, Caravelle Networks Corp., 613/225-1172, \$1395 to \$2495.** For networks that sprawl across buildings or states, this network-monitoring utility is an indispensable tool. It continually polls devices, checking CPUs, routers, printers, and hubs for signs of life. Apr 95
continues

Star Ratings

★★★★ **ProTerm Mac 1.0**, InTrec Software, 602/992-5515, \$129.95. This communications program offers a level of sophistication that belies its small size and ease of use. It's fast, reliable, and stable, and is suitable for simple BBS connections or sophisticated scripting. Jul 95

★★★ **QuickMail 3.0**, CE Software, 515/221-1801, \$199 to \$3799. If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. The most promising new tool, rules-based messaging, lacks some important features. Jan 95

★★★ **RunShare**, Run, Inc., 201/529-4600, \$199 to \$2499. System extension endeavors to pump up file-transfer speeds across networks. It offers twofold to threefold throughput gains for fast Macs and large files but is less useful with small files or slow Macs. Feb 95

★★★ **Saber LAN Workstation**, Saber Software, 214/361-8086, \$199 plus \$49 per node. LAN-management package includes programs for network administration and remote software updating. Although it lacks some of the niceties of network-management software for other platforms, it's a useful tool for the price. Aug 95

★★★★ **Skyline/Satellite**, AG Group, 510/937-7900, 1-station pack \$795; 5-station pack \$1195; 10-station pack \$1995. Remote monitoring engines keep an eye on LAN traffic, using the Mac's Ethernet port. It's a great system, but for large LANs the price can go sky-high. Sep 95

★★★★ **Snatcher 1.0**, Software Ventures, 510/644-3232, \$49.95. FTP tool lets you connect to multiple sites simultaneously, transfer several files at once, and create scripts to automate repetitive tasks. Happily, you can continue to browse while downloading files. Aug 95

★★★★ **White Knight 12.0**, The FreeSoft Company, 412/846-2700, \$139. While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

DESKTOP PUBLISHING

★★ **CheckPost 1.3**, Working Software, 408/423-5696, \$89.95. Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

★★★ **ClickBook 1.1 (1.2)**, BookMaker Corp., 415/354-8161, \$69.95. If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

★★★ **Download Mechanic 1.0.2 (1.5)**, Acquired Knowledge, 619/587-4668, \$249. The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95

★★★★ **LaserCheck 1.0**, Systems of Merritt, 334/660-1240, \$199. Imagesetter-simulation software can save you hundreds of dollars, and many hours, on image-setting jobs by letting you use a laser printer to proof your work. Nov 94

★★★★ **Let'er RIP 2.0 (2.0.1)**, Lupin Software, 916/756-7267, \$239. The flexibility, clean implementation, and attention to detail of this PostScript downloader make it a pleasure to use. Feb 95

★★★★ **PageTools 1.0**, Extensis Corp., 503/274-2020, \$129. Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94

★★★★ **theTypeBook 4.0**, Rascal Software, 805/255-6823, \$59.95. The manual needs work, but this type-specimen generator provides enough customization options to make it a worthwhile purchase. Jun 95

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1**, EA World, 415/571-7171, \$79.95. Well-designed atlas enriches map data with narration, photos, and QuickTime movies. May 95

★★★★ **A.D.A.M. The Inside Story**, A.D.A.M. Software, 404/980-0888, \$79.95. Multimedia anatomy CD-ROM teaches basic anatomy and physiology with a tantalizing mix of sound, graphics, and animation. If you are the least bit interested in learning more about how the human body works, buy this program. Mar 95

★★★ **Aquazone 1.0**, Inago, 416/487-4005, \$59. The fish in this aquarium simulation are beautiful, but they're damned hard to keep alive. Only two varieties of fish are included. Jan 95

★★★★ **Crossword Wizard 1.0**, Cogix Corp., 415/454-7217, \$49.95. If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94

★★★ **CyberBoogie**, Times Mirror Multimedia, 314/531-2503, \$49.95. The easy interface, bouncy songs, and cute graphics of this children's animation software make it a good choice for very young kids, but its relative lack of features restricts it to the same group. Apr 95

★★★★ **The Daedalus Encounter**, Virgin Interactive Entertainment, 714/833-8710, \$59.95. You've been blown to smithereens and your brain has been stuffed inside a robot. Don't you hate it when that happens? Escape from a doomed spacecraft in this interactive adventure. Sep 95

★★★ **Digital Chisel 1.2**, Pierian Spring Software, 503/222-2044, \$199.95, site license \$995. If I had a Chisel, I'd Chisel out some quizzes; I'd say how easy this is—no I wouldn't. Ahem. What I mean is: this authoring tool lets educators create interactive quizzes, but suffers from a nonstandard interface. Jun 95

★★★ **Kids World**, Bit Jugglers, 415/968-3908, \$30. Although the painting tools could be more robust, this screen-saver-creation tool for kids is easy to use, cleverly designed, and can keep kids busy for hours. Mar 95

★★★★ **Material World**, StarPress Multimedia, 415/274-8383, \$59.95. This multimedia CD-ROM provides a fascinating look at diverse cultures from around the world by documenting the lives of average families. Jun 95

★★★★ **Math Workshop**, Broderbund Software, 415/382-4700, \$40. Youngsters can have some fun while learning math with this collection of math-related and problem-solving games. Six-to-nine-year-olds will enjoy activities like Rhythm Shop and Bowling for Numbers. Aug 95

★★★ **Small Blue Planet 2.0 (2.0.1)**, Now What? Software, 415/885-1689, \$59.95. The satellite photos of this atlas are truly dazzling, although the interface is less than world class. May 95

★★★★ **Storybook Weaver Deluxe 1.0**, MECC, 612/569-1500, \$69.95. Hooray for applications that encourage kids to be creative! This one lets them combine pictures, sounds, and words to make their own storybooks. May 95

★★★★ **Theorist 2.0**, Waterloo Maple Software, 519/747-2373, \$299. Despite an occasionally odd interface (for example, a hammer icon), this symbolic-math program is a great learning aid for students. Jun 95

★★★★ **WarPlanes 1.0**, Maris Software, 800/

336-0185, \$69. Wonderful multimedia CD-ROM tours the post-WWII era in military aviation. As well as pictures and text, it includes rotatable models of aircraft, an extensive database, and three flight simulators. Mar 95

★★★★ **Widget Workshop**, Maxis Software, 510/254-9700, \$44.95. Fiendishly clever mad scientist's laboratory allows you to build Rube Goldberg-style widgets out of metronomes, switches, light bulbs, and much more. It encourages imagination and exploration, plus kids think it's cool. Apr 95

FINANCE/ACCOUNTING

★★★★ **M.Y.O.B. 5.0**, BestWare, 201/586-2200, \$139; \$239 w/payroll. A well-designed interface makes double-entry accounting easy enough for anyone to do. And—for those small-business owners who are keeping an eye on the bottom line—the price is right. May 95

★★★ **QuickBooks 3.0**, Intuit, 415/322-0573, \$119. Full-featured double-entry accounting program is easy to use, but its operation is not entirely Mac-like and its cryptic error messages may cause you to ignore serious problems. Jun 95

★★★★ **Quicken 5.0**, Intuit, 415/322-0573, \$49.95. A calendar and new ease-of-use features keep this personal finance software comfortably ahead of the pack. This upgrade is an incremental, but still welcome, improvement over an already excellent product. Feb 95

★★★ **StreetSmart 1.0**, Charles Schwab & Company, 800/334-4455, \$59. If Schwab is where you want your investments held, and if you want to have tighter control over your portfolio and to save on brokerage fees, you should seriously consider this financial investment software. Feb 95

GRAPHICS

★★★★ **Adobe Dimensions 2.0**, Adobe Systems, 415/961-4400, \$199. 3-D effects software has added color support, as well as drawing and text tools. Its ability to create resolution-independent 3-D images and map two-dimensional art earn Dimensions a place on a designer's hard drive. Apr 95

★★★★ **Adobe Photoshop 3.0**, Adobe Systems, 415/961-4400, \$895. Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While it's not perfect, the pros far outweigh the cons. Jan 95

★★★ **Alien Skin Textureshop 1.0**, Virtus, 919/467-9700, \$99. Apply mutations to master textures to create custom patterns made up of seamless tiles. Control freaks won't like this program's random mutations, but it provides a simple way to create patterns. Jul 95

★★ **Art Explorer 1.0**, Aldus Consumer Division, 206/628-2749, \$49.95. While its cartoon style is refreshing and its features promising, this paint/draw program for kids is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

★★★★ **Blueprint 5.0**, Graphsoft, 410/290-5114, \$295. For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ **CD-Q 2.0**, Human Software Company, 408/741-5101, \$145. Take advantage of Kodak's YCC format for Photo CD with this Photoshop plug-in, which lets you make color corrections and fine-tune color separations. If you frequently use Photo CD for image processing, this is the way to go—if you don't mind an inelegant interface and per-

functory documentation. Jul 95

★★★ **ClarisDraw 1.0 (1.0v2), Claris Corp., 408/727-8227, \$399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. Considering the wobbliness of some of its features, however, \$400 may be too much to pay. Jan 95

★★★ **Color Compass 1.0 (1.1), Praxisoft, 703/729-3391, \$129.** Speedy, specialized tools allow you to blend, match, and tweak colors in subtle ways not possible in most programs. Although graphics experts might not need this program, it provides helpful visual feedback for creating and organizing color palettes. Aug 95

★★★★ **Color It 3.0, MicroFrontier, 515/270-8109, \$149.95.** Don't turn Old Paint out to pasture yet. This venerable paint program has been updated with a number of powerful new features, including precise control over pressure-sensitive input, convolution functions, and a focus filter. A great program for beginners. Aug 95

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, \$99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **ElectricImage Animation System 2.0 (2.1), Electric Image, 818/577-1627, \$7495.** Although the price may seem incredibly high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematic-production professionals. Dec 94

★★ **FloorPlan Plus 1.1, ComputerEasy International, 602/829-9614, \$49.95.** Simple, affordable CAD program is intended for rudimentary design tasks. While it offers a good set of basic drafting tools, it falls short in several areas; only 16 colors are supported, for example, and rulers are nowhere to be found. Sep 95

★★★★ **Flying Colors, Davidson & Associates, 310/793-0600, \$59.95.** While not the most dynamic kids' program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

★★★★★ **Fractal Design Painter 3 (3.1), Fractal Design Corp., 408/688-8800, \$499.** Image-creation program has achieved a rare state of perfection, balancing enhanced conventional controls with spectacular effects packaged inside a tidy interface. It offers a new level of usability and genuine practicality. Apr 95

★★★★ **FullPixelSearch 1.5, Avian Systems, 201/224-2025, \$1295.** Analyze scientific images with a variety of pixel-selection functions. It's a useful tool for scientists, but could use batch processing, scripting, the ability to handle 12- and 16-bit images, and a hefty manual. Jul 95

★★★ **Gryphon Batch It 1.0, Gryphon Software, 619/536-8815, \$199.** Arranges tiles in a visual interface to automate repetitive graphics operations. Although it lacks conditional statements, this batch processor is a time-saver. Jun 95

★★★ **Intelligence 1.0, DPA Software, 214/517-6876, \$129 to \$299.** Photoshop plug-in automates the process of improving scanned graphics with color correction and control over contrast, focus, and graininess. Sep 95

★★★★ **KPT Bryce 1.0 (1.1), HSC Software, 805/566-6200, \$199.** For less than \$200, you get a remarkable 3-D landscape-rendering program, a CD-ROM of images, a slide-show utility, and some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

★★★★★ **KPT Convolver 1.0, HSC Software, 805/566-6200, \$199.** Create your own Photoshop filters the intuitive way with this imaginative and absorbing plug-in module. The interface allows you to experiment, com-

binning effects, tweaking results, and applying multiple undos if necessary. Aug 95

★★★★ **Live Picture 2.0, HSC Software, 805/566-6200, \$995.** Latest version of this innovative image editor boasts lower RAM requirements, faster operations, and a much lower price tag than the original. Sep 95

★★★★★ **LogoMotion 1.0 (1.5), Specular International, 413/253-3100, \$149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★★ **MacDraft 4.0, Innovative Data Design, 510/680-6818, \$449.** Report-links to Excel and a clean interface make this 2-D CAD software an excellent choice for use in mechanical engineering and construction. Plus, it's easy to learn. Mar 95

★★★★★ **MacPhase 2.0, The Otter Solution, 315/768-3956, \$279.** This speedy, feature-rich program offers the full spectrum of standard scientific and graphics image processing tools. Note that it's aimed at technical users, not dabblers. Aug 95

★★★★★ **Macromedia FreeHand 5.0, Macromedia, 415/252-2000, \$595.** The new version of this venerable program has not only kept pace with the competition but has also added unique features of its own. Although the interface is more cluttered than ever, the wealth of new capabilities make this the drawing program to buy. May 95

★★★★★ **MiniCad 5, Graphsoft, 410/290-5114, \$795.** Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

★★★ **MovieFlo' 1.1, The Valis Group, 415/435-5404, \$899.** Tug, twist, and pinch your sister—or at least a digital image of her—with this special-effects program for stills or QuickTime movies. Well-designed application is hampered by a steep price and a poor manual. Jun 95

★★★★★ **Paint Alchemy 2.0, Xaos Tools, 415/487-7000, \$199.** An interface lift, additional blending options, and improved animation controls make this flexible image editor an appealing add-on for digital artists. Sep 95

★★★★★ **PhotoEnhancer 1.0, PictureWorks, 510/855-2001, \$129.** Nifty utility provides dozens of ways to improve the quality of QuickTake photos, from sharpening or softening focus to correcting over- or underexposed shots. Apr 95

★★★ **PhotoFix 2.8.8, Microspot USA, 408/253-2000, \$249.** This image-editing/photo-enhancement program needs refinement, but its modest price and its ability to optimize images for output to low-end printers make it a useful tool. Sep 95

★★★ **PhotoFlash 2.0, Apple Computer, 408/996-1010, \$129.** If you want to enhance or catalog images acquired from a scanner or a digital camera such as Apple's QuickTake 100, consider this utility. It's not a high-end image-editing program, but it does offer basic image-retouching tools at a reasonable price. Jul 95

★★★ **PhotoMatic 1.01 (2.0), DayStar Digital, 404/967-2077, \$199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. It's limited, but it can relieve you of some mundane chores. Nov 94

★★★★★ **Pixar Typestry 2.1, Pixar, 510/236-4000, \$299.** With QuickDraw GX support, an approachable interface, a strong array of animation features, and outstanding image quality, this 3-D type-effects software is worth a try. It adds a new dimension to the way you look at type. Feb 95

★★★★★ **PixelPaint Pro 3.01, Pixel Resources, 404/449-4947, \$379.** Color paint program strikes a good balance between the artistic demands of painting and

the technical precision of image processing. Mar 95

★★★ **PixelPutty Solo (1.5), The Valis Group, 415/435-5404, \$399.** Affordable modeler lets you manipulate 3-D objects as if they were clay. It's a capable program, but a bare-bones interface and skimpy manual make it somewhat daunting for novices. Jun 95

★★★ **Ray Dream Designer 3.1.1, Ray Dream, 415/960-0768, \$349.** 3-D graphics program provides competent (if sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Mar 95

★★★ **ScanPrepPro 1.2 (2.0), ImageXpress, 404/564-9924, \$695.** Adobe Photoshop add-on automates scanning and image-messaging and produces good results, although the program is somewhat unstable. Nov 94

★★ **Select 1.6, Human Software Company, 408/741-5101, \$245.** Although its selection mode provides a convenient and intuitive way to make changes to several colors at once, all the features of this CMYK color-correction plug-in can be found in Photoshop. Jul 95

★★★★★ **SmartSketch 1.0, FutureWave Software, 619/637-6190, \$69.95.** Innovative, easy-to-use graphics program unites the free-form creativity of a paint program with the structure and precision of object-oriented drawing. Sep 95

★★★ **Specular Collage 2.0.1, Specular International, 413/253-3100, \$399.** Practical image-compositing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you're willing to return to Photoshop to confirm your edits and make final changes, it's a serviceable tool. Feb 95

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, \$199.** Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of fabric, graphic, and video designers. Nov 94

★★★★★ **TextureScape 1.5, Specular International, 413/253-3100, \$195.** Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it's simple enough to be fun and flexible enough to give you meaningful control. Feb 95

★★★★★ **TypeTwister 1.0, Adobe Systems, 415/961-4400, \$29.99.** Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95

★★★ **Virtus WalkThrough Pro 2.0, Virtus Corp., 919/467-9700, \$495.** Aside from occasional stumbles, this design tool is an exceptional program that lets you quickly and intuitively interact with your designs and gives clients the opportunity to visit and explore your creations before they are built. Apr 95

★★★★★ **Vision 3d 4.0, Strata, 801/628-5218, \$695.** 3-D modeling, rendering, and animation package expands its array of modeling tools and adds two renderers. Plug-in extensions provide a practical way to customize the program, while easy-to-read documentation makes learning its many features relatively painless. Jul 95

★★★ **Vistapro 3.0, Virtual Reality Laboratories, 805/545-8515, \$149.95.** 3-D landscape rendering software uses digital versions of U. S. Geological Survey maps to create images and allows you to add external features such as buildings and rivers. Although it's a good program, it has some limitations. Feb 95

★★ **xRes 1.11, Fauve Software, 415/543-7178, \$799.** You can apply a variety of effects to selected areas of a large composition with this image editor. Although it offers pluses such as useful filters and customizable gradients

Star Ratings

ents, this program's numerous interface oddities make it less attractive than the competition. Jul 95

MATH/SCIENCE

★★★★ **Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, \$99.** Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

★★★★ **Kekulé 1.1, PSI International, 410/821-5980, \$495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

★★★★ **The Fuzzy Logic Toolbox 1.0, MathWorks, 508/653-1415, \$895.** Control-system engineers who want to incorporate fuzzy logic into their systems will find this software an excellent aid. It includes a helpful tutorial and a well-designed graphical interface. Sep 95

★★★★ **MATLAB 4.1 (4.2c), The Math Works, 508/653-1415, \$1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first choice for many applied-science specialties. Nov 94

★★★★ **MLab, Civilized Software, 301/652-4714, \$1495.** Mathematical-modeling software lets you do fast computation on numerically complex real-world problems, using an ancient Mac II or higher. You must be willing to write short programs, but professional researchers will find it a rewarding choice. Apr 95

★★★★ **Statistica/Mac 4.1, StatSoft, 918/583-4149, \$695.** At present, this statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

★★★★ **Survival Tools 1.0 (1.1), Abacus Concepts, 510/540-1949, \$295.** The combination of survival analysis with the StatView template systems gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged. Feb 95

ORGANIZATION/PRODUCTIVITY

★★★★ **ACT 2.0, Symantec Corp., 503/334-6054, \$249.95.** Contact manager's file-level compatibility with DOS and Windows and its complete contact management make it worth considering if you can live with its weak scheduling functions. Mar 95

★★★★ **Arrange 2.0, Common Knowledge, 415/325-9900, \$349.** If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

★★★★ **Claris Organizer 1.0 (1.0v2), Claris Corp., 408/727-8227, \$99.** New personal information manager users, lured by the price, performance, and ease of use of this product, will find that it meets their needs. Most longtime PIM users won't be tempted to switch. Jan 95

★★ **ClientTrac 2.0, Whiskey Hill Software, 415/851-8702, \$99.** It's easy to enter contact information, but this PIM is slim on speed, features, and flexibility. May 95

★★★ **Day-to-Day Organizer 1.0, Portfolio Software, 802/434-6400, \$149.95.** The address-book and outlining components of this organizer are great, but overall it's a mixed bag. The calendar interface and the way it handles recurring events need to be improved. May 95

★★★ **Expresso 1.0, Berkeley Systems, 510/540-5535, \$69.99.** The just-the-basics approach of this calendar and address book might be just fine for people who don't need the feature set of other calendar programs and enjoy its graphics. Apr 95

★★★★ **FastPace Instant Contact 1.0 (1.1), Attain Corp., 617/776-1110, \$39.99.** Although this contact manager could use a few additional features—especially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

★★★★ **FastTrack Schedule 3.0, AEC Software, 703/450-1980, \$299.** Updated version of this project planner includes a detailed calendar, a customizable Gantt chart, and new formatting columns, but additional customization options would be helpful. Aug 95

★★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, \$149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

★★★★ **In Control for Workgroups 3.5, Attain, 617/776-1110, \$149.95; 10-pack \$949.95.** Flexible project planner and scheduler combines an outline and a calendar. It's a valuable tool for networked groups that need to share project information. Sep 95

★★★★ **InTouch 2.5, Prairie Group, 515/225-3720, \$69.95.** Free-form contact manager offers speedy access to information. If you don't need to perform complex searches or sorts, this program is a good choice. Sep 95

★★★★ **Now Contact and Now Up-to-Date 3.0, Now Software, 503/274-2800, \$99.** Taken together, this contact manager and calendar provide a set of solid, reliable tools for keeping your life in order. Users who need to share information over a network may find it close to ideal. Apr 95

★★ **Peanuts Family Organizer 1.0, Individual Software, 510/734-6767, \$19.95.** "Hey, Pop, can I borrow the car Saturday night?" "Look at the family PIM and check my calendar, Son." This organizer's endearing interface doesn't make up for missing or poorly implemented features. Jun 95

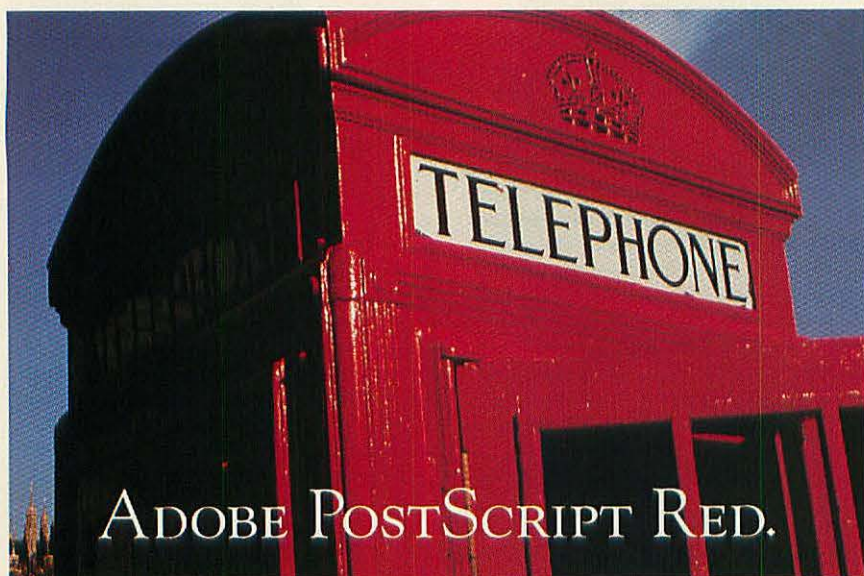
★★ **Souvenir 2.2, ComposeTel, 415/327-0744, \$49.** This contact manager is fast and simple, but it's hard to recommend when you can buy integrated contact managers and schedulers for about the same price. Dec 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0 (4.0.1), Adobe Systems, 415/961-4400, \$795.** Video-editing software remains as solid and reliable as previous versions, and also advances far and above its competitors with new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

★★★★ **Amazing Animation 1.0, Claris Corp., 408/727-8227, \$49.** Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however. Jan 95

★★★★ **Electronic Marker 1.0.2, Consumer Technology Northwest, 503/643-1662, \$34.95.** This annotation tool can be a practical enhancement to live



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demos and on-screen presentations, but it needs better controls for modifying and preserving markup layers. May 95

★★ **Living Album 2.5, QuickMedia Labs, 408/749-9200, \$129.95.** A crowded interface detracts from the usefulness—and aesthetics—of this multimedia album. May 95

★★★★ **MediaPaint 1.0, Strata, 801/628-5218, \$695.** Anyone who produces special effects for QuickTime movies will welcome this program, which lets multimedia developers edit ranges of frames. Although it's a RAM hog, this useful tool removes much of the tedium of special-effects work. Sep 95

★★★★ **Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, \$339.** If you're in the market for a presentation-graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, other alternatives have the edge. Feb 95

★★ **mPower 2.0, Multimedia Design Corp., 704/523-9493, \$295.** Despite a handful of sophisticated multimedia features, this authoring tool is too limited to be compelling. While its push-button interface is easy to understand, it's far too cumbersome. Apr 95

★★★★ **The Multimedia Workshop, Davidson & Associates, 310/793-0600, \$79.95.** Children or adults can use this media-integration tool without big investments of time or money. It's full of compromises, though, such as the inability to layer narration over music. Nov 94

★★★★ **Presenter Professional 3.0, VIDI, 818/358-3936, \$1995.** The improved interface, enhanced animation module, and reduced price of this 3-D modeling and animation package make it an excellent choice for multimedia producers. The new audio features are especially appealing. May 95

★★★★ **SoundEdit 16, Macromedia, 415/252-2000, \$379.** Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

★★ **Special Delivery 2.0, Interactive Media Corp., 415/948-0745, \$399.** Multimedia authoring tool can be confusing and isn't the best choice for complex projects. Still, it may save hours of training for users who merely need to create simple presentations. Apr 95

★★★★ **SuperCard 1.7.1 (2.0), Allegiant Technologies, 619/587-0500, \$495.** Multimedia authoring system adds a few welcome enhancements and squashes some old bugs. For current users, the upgrade is well worth the price; for others, it's an excellent alternative to more expensive authoring systems. Feb 95

★★★★ **TransJammer, Elastic Reality, 608/273-6585, \$99.** Plug-in for Adobe Premiere and Avid VideoShop offers 100 customizable video-transition effects, ranging from the conventional to the, well, odd (like falling cows). If you've ever tried to make your own falling-cows transition, you'll appreciate this time-saving tool. Aug 95

PROGRAMMING

★★ **ScriptWizard 1.0, Full Moon Software, 408/253-7199, \$99.** Software attempts to make writing and debugging AppleScript scripts easier. Unfortunately, it doesn't offer enough improvement over Apple's Script Editor. Jan 95

★★★★ **Symantec C++ 8.0, Symantec, 503/334-6054, \$499.** The new version of this development environment offers native PowerPC compilers for C++ and ANSI C. The project manager and class browser have been improved and the compiled code is laudable, but our review-

er had some complaints about the package's resource demands and the company's support reputation. Jul 95

★★★★ **VIP-C 1.5 (1.5.1), Mainstay, 805/484-9400, \$495.** For convenience in producing 680X0/Power Macintosh applications, this programming utility is a fine investment. Intermediate to advanced users will get the most benefit, but even beginners will find that it helps turn student projects into serious apps. Feb 95

UTILITIES

★★★★ **Aladdin Desktop Tools 1.0, Aladdin Systems, 408/761-6200, \$89.95.** Not all the utilities in this collection are perfectly implemented, but Desktop SpeedBoost and Desktop Printer make the package worth its price. The rest can be considered a bonus. Aug 95

★★ **Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, \$129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

★★★★ **Cal 1.0, Thought I Could, 212/673-9724, \$79.95.** Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

★★ **CanOpener 3.0, Abbott Systems, 914/747-4171, \$125.** You can use this handy utility to open many types of files—which can be a lifesaver if you don't have

the application a file was created in—but it falls a little short in the file-search department. May 95

★★★★ **CD Directory 1.0, Insignia Solutions, 415/694-7600, \$69.95.** Store catalogs of CD directories on your hard drive—and access them at hard drive speeds—with this handy utility. One complaint: cataloged CDs are treated as local drives, greatly increasing search time during a global search. Jul 95

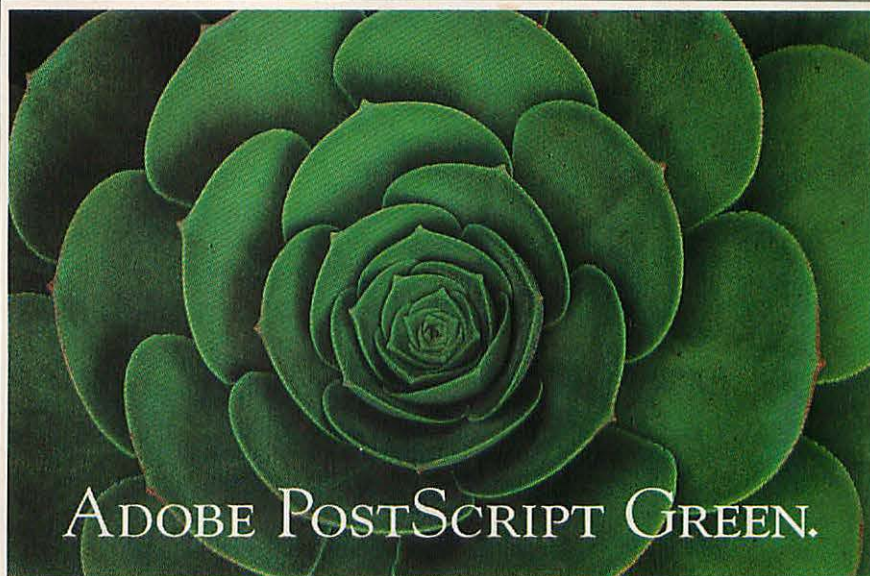
★★★★ **Conflict Catcher 3, Casady & Greene, 408/484-9228, \$99.95.** This extension-management utility was already great—and it just got better. Like a digital Jimmy Carter, it offers a friendly, flexible approach to conflict resolution. Sep 95

★★★★ **Disc-To-Disk, Optical Media International, 408/376-3511, \$199.** Audio-capture utility's friendly interface provides a simple way to transfer sound from a CD to the Mac's hard drive. A useful tool for multimedia authors. Jun 95

★★★★ **DiskGuard 1.0.1 and DiskGuard Remote, ASD Software, 909/624-2594, \$129 to \$799.** Rock-solid, flexible disk-protection tools are worth serious consideration if your Mac or Macs are accessible to other users. The remote version (which comes in five- and ten-user packs) adds network features, including clock synchronization. Mar 95

★★ **DragStrip 1.0, Natural Intelligence, 617/876-4876, \$39.95.** Icon-based file and folder organizer brings a semblance of order to your cluttered desktop. But your troubles aren't over unless a future version lets you label folders. May 95

continues



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Star Ratings

★★★★ **Drive7 3.0 (3.09), Casa Blanca Works, 415/461-2227, \$89.95.** Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And with its limitations, its Mount Cache utility provides a real performance boost. Nov 94

★★★★ **eDisk 2.0, Alys Software Corp., 415/928-2895, \$149.95.** Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

★★★★ **FolderBolt Pro 1.0.3, Kent Marsh, 713/522-5625, \$129.95.** Feeling unsecured? Top-notch encryption schemes and flexible access controls let you secure your Mac's contents by password-protecting folders and encrypting the data they contain. Jul 95

★★★★ **Graffiti 1.01, Palm Computing, 415/949-9560, \$79.** If you can't seem to teach Newton your handwriting, you can teach yourself a new writing system that Newton can handle. Kind of makes you wonder who's running the show, but it works. May 95

★★★★ **InstantReplay 1.0, Strata, 801/628-5218, \$149.** Now you see it, now you see it again. This utility records on-screen activity, including audio, and saves it as a QuickTime movie. File-conversion capabilities are an added bonus. Sep 95

★★★★ **Kaboom 3.0, Nova Development Corp., 818/591-9600, \$49.95.** Sound-effects utility with sound-editing application is a fun program for anyone who wants to play with sound. Feb 95

★★★★ **Launch Pad 1.0, Berkeley Systems,**

510/540-5535, \$49.99. If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

★★★★ **MacTools Pro 4.0, Symantec Corp., 503/690-8090, \$149.95.** This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. May 95

★★★★ **Maxima 3.0, Connectix, 415/571-5100, \$99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

★★★★ **Menu Master Mac, Electronic Learning Systems, 904/375-0558, \$99; 15-site license \$299.** Security software lets an administrator restrict a user's access to certain files on a shared Mac. It's a useful program, but could use some additional features, such as the ability to restrict computer usage to particular times. Sep 95

★★★★ **MultiClip Pro 3.1, Olduvai Corp., 305/670-1112, \$59.** Easy-to-use utility is exactly what Apple's Clipboard and Scrapbook should have been; a convenient repository of data that moves between documents without fuss or muss. Apr 95

★★★★ **Multimedia Utilities 1.1, Motion Works, 415/541-9333, \$299.** Six utilities address QuickTime moviemaking, from editing movies and sound tracks to creating morphs, animations, and screen recordings. Although the utilities are appealing, you must save early and often because of frequent crashes. Jul 95

★★★★ **Norton DiskDoublerPro 1.1, Symantec Corp., 503/334-6054, \$109.** Utility collection

includes DiskDoubler, AutoDoubler, and CopyDoubler. Because of its ease of use, the product is a good choice for beginners. Feb 95

★★★★ **Norton Utilities for Macintosh 3.1, Symantec Corp., 503/334-6054, \$149.95.** Data-protection and -recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly uneven. While Disk Doctor leads the pack for disk-repair utilities, the back-up module is weak and the new UnErase module is missing some features. Feb 95

★★★★ **Now Utilities 5.0, Now Software, 503/274-2800, \$89.** Three of the modules of this finetuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and while the other six may not be tops in their category, they're well worth considering. As a collection, this package remains the best in the business. Jan 95

★★★★ **On Cue II Utilities 3.0, ComputerEasy International, 602/829-9614, \$99.95.** Eight modules add functionality to the Mac Operating System. It's useful, but not as comprehensive as the competition. Sep 95

★★★★ **OptiMem RAM Charger 2.0.1, Jump Development Group, 412/681-2692, \$129.** Use RAM more efficiently with this memory-management utility. The Mac OS ought to work like this, but until it does, you should use this nifty utility. (An added bonus: it works on older Macs, back to the Mac Plus.) Jul 95

★★★★ **PaperPower 1.0, Piptel, 513/294-6656, \$149.** Graphics-tablet utility provides a useful tool for creating and using macros, but the overlays it creates can be tricky to use. Apr 95

★★★★ **Peirce Print Tools 1.0, Peirce Software, 408/244-6554, \$129.** Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

★★★★ **Power Secretary Power Edition 2.0, Articulate Systems, 617/935-5656, \$2495.** This impressively accurate speech-recognition program sits on your Mac and takes dictation, learning your voice patterns as you use it. It's expensive, but provides a viable alternative to keyboard input. Sep 95

★★★★ **PowerAgent 1.1 (2.0), SouthBeach Software Corp., 305/942-0605, \$159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro. Nov 94

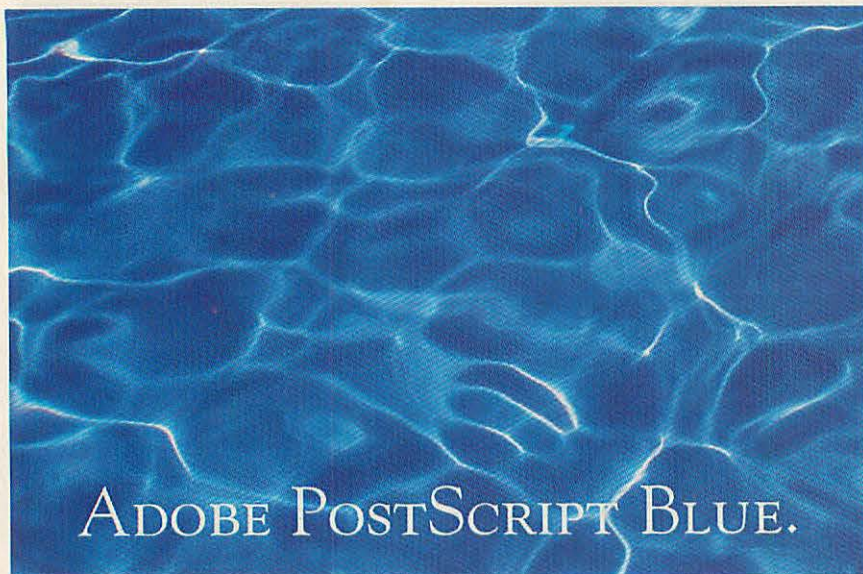
★★★★ **RapidCD 1.04, Insignia Solutions, 415/694-7600, \$69.95.** RAM and disk caching of CD-ROM data speeds access to frequently used data. This utility does its job well, but it's incompatible with the AppleCD Audio Player and doesn't allow you to add to its settings. Jul 95

★★★★ **RescueTxt 1.0, Abbott Systems, 914/747-3116, \$79.** For decent performance and the ability to locate text in even a deleted file, this text-retrieval utility is a good choice. But it doesn't tell you what file the text comes from, so you can't just open the found file. Apr 95

★★★★ **Square One 2.0 (2.0.1), Binary Software, 310/449-1481, \$74.** The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

★★★★ **Stuffit Deluxe 3.5, Aladdin Systems, 408/761-6200, \$129.95.** If you're looking for a compression solution, you should look at this product. Its drag-and-drop applications, Magic Menu, and file translators make it easy to integrate compression into your routine. Mar 95

★★★★ **TypeTamer 1.0.4, Impossible Software, 714/470-4800, \$59.95.** Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from



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the menu. May 95

★★★★ **ultraSecure 3.524**, **usrEZ Software**, 714/756-5140, \$239. Security program offers a comprehensive set of protection tools, but has a few flaws, including incompatibilities with several types of programs. Sep 95

★★★★ **Virex 5.5.1**, **Datawatch Corporation**, 508/988-9700, \$99.95. Comprehensive, reliable, and speedy utility helps protect your files from those misguided lads who get their jollies by releasing viruses. To keep it current, updates are available on online services. May 95

★★★★ **Zonkers 1.0**, **Nova Development**, 818/591-9600, \$19.95. Redecorate your Mac with this collection of silly desktop enhancements. Customize icons, scroll bars, cursors, buttons, menu bars, windows, and desktop patterns to create your own look. Aug 95

VERTICAL MARKETS

★★★★ **Autoscore 1.0**, **Wildcat Canyon Software**, 510/527-5155, \$150. Converting the human voice into MIDI note information is a challenging task. If you have the right music software, mike, and voice, this music-recognition software can actually pull it off. Feb 95

★★★★ **Bird Brain 2.01**, **Ideaform**, 515/472-7256, \$99.95. Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

★★★★ **ConcertWare 1.5.7**, **Jump Software**, 415/917-7460, \$159. Although it lags behind the competition in performance and features, this music-notation program's low price and ease of use make it a viable choice for the budget-wise. Jun 95

★★★★ **DigiTrax 1.1**, **Alaska Software**, 408/738-3320, \$349. If you're an amateur musician or a multimedia producer with modest sound-recording needs and you have a Quadra AV, consider this audio-recording software. What it lacks in features, it makes up for in simplicity and a relatively low price tag. Mar 95

★★★★ **ErgoKnowledge 1.0**, **Visionary Software**, 503/246-6200, \$395. Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

★★★★ **Insta Software**, **Chang Labs**, 408/727-8096, \$29 per module. No-frills, preprogrammed relational databases handle forms and record-keeping for specific businesses. They can't be customized, but the databases are straightforward and require little training or setup. Aug 95

★★★★ **MayaCalc 2.3.1 (2.3.3)**, **Ecological Linguistics**, 202/546-5862, \$120. 4th Dimension database alleviates much of the pain involved in working with the complex, multilayered Maya calendar. Although the design could be improved, it's a highly useful tool for both serious and casual Maya enthusiasts. Feb 95

★★★★ **Maya Hieroglyphic Fonts**, **Ecological Linguistics**, 202/546-5862, \$10 to \$60 per set. Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

★★★★ **Medical HouseCall 1.0**, **Applied Medical Informatics**, 801/464-6200, \$99.95. Interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it's easy to use and interesting, some images were incorrectly labeled. Feb 95

★★★★ **Overture 1.02**, **Opcode Systems**, 415/856-3333, \$495. Easy-to-learn, midrange notation software has a friendly interface and shows real polish. If you don't need all the features of a high-end product, it's a serious contender. Apr 95

★★★★ **Performer 5.02**, **Mark of the Unicorn**, 617/576-2760, \$495. A colorful, redesigned interface and improved sheet-music view are just part of this MIDI recording program's worthwhile overhaul. If you like the sheet-music view, this is the product to buy. Mar 95

★★★★ **Practica Musica 3.0 (3.1)**, **Ars Nova Software**, 206/889-0927, \$140. Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jan 95

★★★★ **Route 66 1.5**, **Route 66 Geographic Information Systems B.V.**, 415/957-0666, \$79.95. Jack Kerouac could have saved a lot of time if he'd used this route planner (unless he was driving to Alaska, which isn't included). It's fast, but omits some cities and can't handle more than three destinations at a time. May 95

★★★★ **Vision 2.08**, **Opcode Systems**, 415/856-3333, \$495. MIDI program's list of exclusive, creativity-slanted features, such as endless count off and scrubbing (which lets you hear the music as you drag across it), give the program a usability edge. Mar 95

WRITING TOOLS

★★★★ **Bookends Pro 3.1**, **Westing Software**, 415/435-9343, \$129. Comprehensive database program catalogs and stores all of your reference material—actual quotes as well as citations. It's a useful tool that researchers will appreciate. Mar 95

★★★★ **EndNote Plus 2.0**, **Niles & Associates**, 510/649-8176, \$299. Despite its power, this

indispensable bibliography and citation manager is surprisingly easy to learn and use. If you have to work with references, it's a good choice. Apr 95

★★★★ **FullWrite 2.01**, **Akimbo Systems**, 617/776-5500, \$395. As the leanest of all high-end word processors, this product requires only 2MB of RAM. Its modular architecture is complex, but it's worth considering if you don't need to share files with the Word/WordPerfect crew. Apr 95

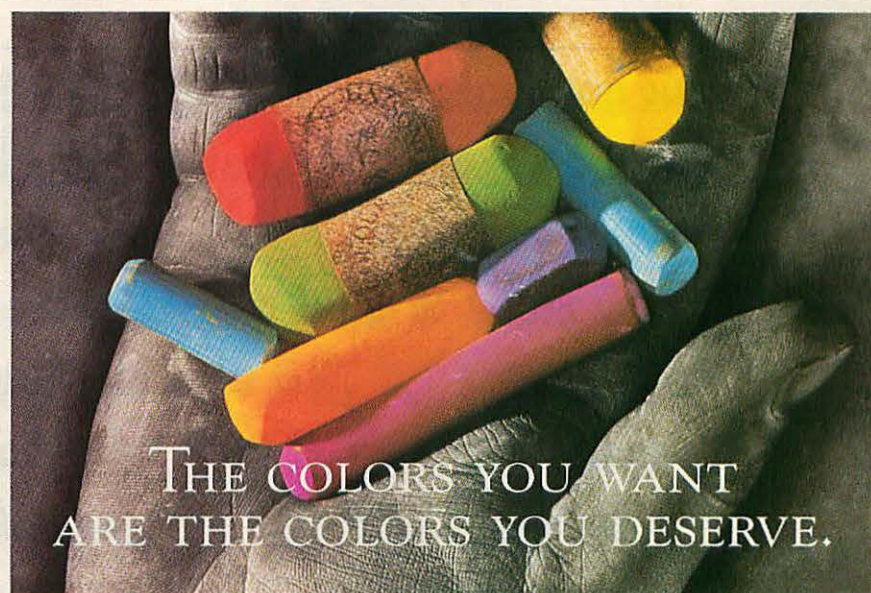
★★★★ **Grammatik 6 for Macintosh**, **Novell**, 801/225-5000, \$49.95. The low price, pleasant interface, and improved accuracy of this grammar checker make it worthwhile for a large number of quality-driven writers. It still misses some errors. Feb 95

★★★★ **Inspiration 4.1**, **Inspiration Software**, 503/245-9011, \$195. Writing tool allows you to move between words and diagrams to show the relationships between ideas. This version adds improved keyboard controls, import and export capability, plus more. Apr 95

★★★★ **Microsoft Word 6.0**, **Microsoft Corp.**, 206/882-8080, \$339. If you can put this word processor's new features—including cross-referencing, AutoText, automatic numbering, macros, and more—to work and you have a Quadra 650 or faster Mac, take the plunge. If you have a slower 68040 Mac, think twice; and if you have a 68030 Mac, don't even think about it. Feb 95

★★★★ **Nisus Writer 4.0**, **Nisus Software**, 619/481-1477, \$495. In a few specialized areas—such as mixing English and non-Romance languages—this word processing program is unmatched. However, for some high-end uses, such as table creation, it's a poor choice. Mar 95

continues



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★★ **Read-It O.C.R. Pro 5.0**, Olduvai Corp., 305/670-1112, \$395. Although this OCR software has a nice collection of features, its recognition engine isn't up to par. It's not a first choice unless you simply need to process piles of very clear Courier text. Apr 95

★★★ **Three by Five 2.0**, MacToolkit, 310/395-4242, \$99. How retro! This idea organizer uses the metaphor of index cards on a corkboard. Unlike real index cards, the program lets you attach QuickTime movies, link cards, or switch to an outline view. Aug 95

★★★ **Writing Coach 1.0**, WritePlace Software, 503/484-6380, \$89. If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

★★★★ **ArtPad**, Wacom Technology, 206/750-8882, \$199. Measuring less than 7 by 7½ inches, this pressure-sensitive tablet is sheer convenience if you're looking for a device that you can hide away one moment and readily exhumate the next. Apr 95

★★★ **ChoiceStick 1.0.2**, Kernel Productions, 302/456-3026, \$69.95. Entering data into a spreadsheet is much quicker if you use a joystick instead of a mouse. Well, maybe you can convince your boss of that. Otherwise, use this port to attach a pair of joysticks to your Mac so you can play games. Sep 95

★★★★ **DrawingSlate II**, CalComp, 602/948-6540, \$395. A responsive stylus and user-definable macros make this digitizing tablet an excellent choice for artists and illustrators. Jun 95

★★★★ **FlightStick Pro for Macintosh**, CH Products, 619/598-2518, \$129.95. The authentic feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

★★★ **GlidePoint**, Alps Electric, 408/432-6000, \$99. If you find moving the mouse a pain in the arm, you might want to try this alternative pointing device, which lets you position the cursor by moving your finger across its surface. Jul 95

★★ **Jetstick**, CH Products, 619/598-2518, \$74.95. Our reviewer liked this joystick's hardware but found the manual and the software lacking. Sep 95

★★★★ **Mac Keyboard Deluxe**, MicroSpeed, 510/490-1403, \$125. If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

★★★ **MacAlly**, The Mace Group, 213/780-6110, \$49. It may not be a better mouse, but it's a cheaper one. This ADB mouse doesn't stand out from the crowd, but it's durable, glides smoothly, and won't leave a big hole in your pocketbook. Jul 95

★★★ **Mouse Deluxe Mac**, MicroSpeed, 510/490-1403, \$69. The extra buttons of this mouse offer several features that Apple's mouse doesn't match, but its shape may not suit everyone's taste. Mar 95

★★★★ **PaperPort**, Visioneer, 415/812-6400, \$399. The paperless office is actually here. This

clever combination of elegant hardware and intelligent software makes it easy to capture, organize, and retrieve documents. Once a page is scanned in, you can annotate it; run it through OCR software; or print, fax, or E-mail it. May 95

★★★ **QuePoint**, MicroQue, 801/263-1883, \$149. Tired of shoving a mouse around? Slide your finger across this tiny input device to manipulate the cursor with a minimum of movement. May 95

★★★ **Remote Point**, InterLink Electronics, 805/484-1331, \$199. Although it may not be a first choice for desktop work, this infrared pointing device is an elegant workaround for users who don't want to (or can't) be tethered to their Macs. Apr 95

★★★★ **Thinking Mouse Macintosh ADB**, Kensington Microware, 415/572-2700, \$139.95. A mouse is a mouse is a mouse. Not so. This one has four programmable buttons that you can use—with the accompanying software—to automate such tasks as selecting commands and typing text. May 95

★★★ **Trackball Pro ADB**, CH Products, 619/598-2518, \$119.95. Although this trackball is less expensive than the competition's, it falls short in program-mability and overall functionality. Sep 95

MISCELLANEOUS HARDWARE

★★★★ **AirNote 1.0 (1.1)**, Notable Technologies, 510/208-4400, \$299. Remote-messaging service lets you originate alphanumeric paging messages from your own computer, eliminating both dictation charges and errors in translation. It's a very handy way to get into alphanumeric paging. Dec 94

“Can you make that **green** a bit more **blue** but not so **BLUE** it's **navy** and not so **yellow** it's **lime**? I mean I want **red** in the **green** to **BROWN** it up a bit. Would that look good on a **peach** background? Ummm, about that background color...”

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praxiscorp@aol.com

★★★ **Apple PCMCIA Expansion Module, Apple Computer, 408/996-1010, \$219.** Well-integrated, well-designed unit offers 500-series users an efficient and easy albeit expensive way to add features to their PowerBooks. If you can overlook the early-adopter prices (a big if), the PC Cards are great expansion options—lightweight, low-power, and high-performance. Mar 95

★★★★ **Colotron, Light Source Computer Images, 415/925-4200, \$1195.** Getting the colors on your screen to match those in your output is now easy and affordable, thanks to this hand-held spectrophotometer, which measures transmissive and reflective sources. Jun 95

★★★★ **DayStar PowerPro 601/DayStar Turbo 601, DayStar Digital, 404/967-2077, PowerPro 601 \$1599; Turbo 601 \$1499.** Squeeze more performance out of your Mac with these impressive 601-based accelerator cards. Sep 95

★ **EAB401P Speakers, Panasonic Communications & Systems, 800/742-8086, \$99.** Small, inexpensive speakers provide less-than-state-of-the-art performance. The audio is thin and reedy. Apr 95

★★ **EAB701P Speakers, Panasonic Communications & Systems, 800/742-8086, \$249.** The sound of these speakers is thin and slightly harsh, although they are attractive in a high-tech sort of way. Apr 95

★★★★ **MMS557, Audio-Technica USA, 216/686-2600, \$149.95.** Among a huge selection of similarly priced speaker systems, these stand out as a best buy. They look good, as well as sound good. Apr 95

★★★★ **MultiSpin 4Xe, NEC Technologies, 708/860-9500, \$515.** With its competitive price, free tech support, and two-year warranty, this quad-speed CD-ROM player is ready to race. Feb 95

★★ **NEC AudioTower, NEC Technologies, 800/632-4636, \$99.** Looks great; sounds mediocre. Although this speaker system provides a convenient jack for an external CD drive, the sound quality is nothing to shout about. May 95

★★★★ **Photo Engine, Radius, 408/541-6100, \$1099.** Photoshop acceleration hardware's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up 25 Photoshop functions on the most sophisticated systems, including Power Macs. Feb 95

★★★★ **Reno Portable CD-ROM Player, MediaVision, 510/770-8600, \$349.** Have CD-ROM, will travel. This portable player is lightweight, versatile, and easy to set up; about the only complaint is its short battery life. Jun 95

★★★★ **Vivace, Coda Music Technology, 612/937-9611, \$2295.** As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. Jan 95

★★★ **Vivid 3D Pro, NuReality, 714/442-1080, \$149.95.** This sound-enhancement system uses the SRS technique to produce 3-D sound from a pair of speakers. While it's great for system sounds and games, it's less impressive for audio CDs. Aug 95

★★★★ **YST-SS1010, Yamaha Corporation of America, 714/522-9240, \$349.95.** With a name like YST-SS1010, you have to be good. And it is. This satellite-and-subwoofer speaker system is highly recommended, despite its mediocre manual. Jul 95

MODEMS/NETWORK HARDWARE

★★ **Cooperative Adapter, Photonics Corp., 408/955-7930, \$449.** The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the

extremely low cost of traditional LocalTalk adapters and cabling make this infrared network interface an expensive niche product. Dec 94

★★★ **DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, \$299 to \$369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. Nov 94

★★★ **FastSwitch 10, Grand Junction Networks, 510/252-0726, \$6250.** Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. Dec 94

★★★★ **OneWorld Combo, Global Village Communication, 408/523-1000, without modems \$1499; with modems \$2099.** It is the very model of a multiuser modem pool. You can't receive a fax, but barring that, this server's really cool. Sep 95

★★★★ **OneWorld Internet 1.0, 700 Series, Global Village Communication, 408/523-1000, \$1699 plus monthly fee.** Users of an office network can connect to the Mother of All Networks with this Internet gateway. It offers E-mail and direct Internet access in an approachable format. Jun 95

★★★ **Pocket EtherTalk Adapter, Xircom, 805/376-9300, \$349 to \$399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 408/523-1000, \$399.** Top-notch internal fax modem for 500-series PowerBooks is capable of exemplary fax and data communications performance. Nov 94

★★★★ **TelePort Platinum, Global Village Communication, 408/523-1000, \$279.** If you want V.34 (28.8-Kbps) data and 14.4-Kbps faxing capability, incoming-call recognition, and an answering machine—all over a single telephone line—this reliable fax modem has it all covered. Aug 95

PRINTERS

★★★★ **Apple Color StyleWriter 2400, Apple Computer, 408/996-1010, \$525.** Economical, Quick-Draw-based color ink-jet printer offers gorgeous color output plus fast black-and-white printing. If you don't need DOS/Windows compatibility, it's a good buy. Apr 95

★★★★ **HP LaserJet 5MP, Hewlett-Packard, 800/752-0900, \$1299.** This laser printer meets the high demands of small businesses and home offices with features such as 600-dpi resolution, support for Adobe PostScript Level 2, and automatic-input switching between DOS/Windows machines and Macintosh networks. Memory Booster software makes good use of the printer's 3MB of RAM. Jul 95

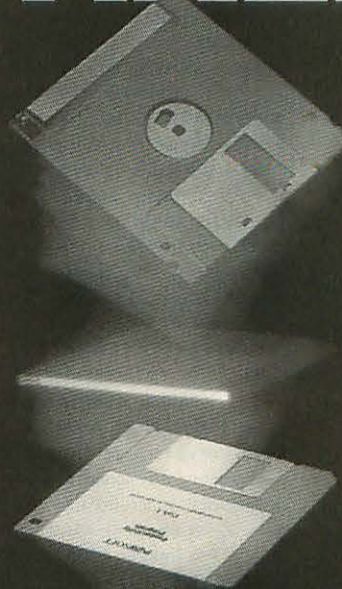
★★★★ **LaserWriter 16/600 P5, Apple Computer, 408/996-1010, \$2399.** If speed is what you need, this fine printer is it. The price is reasonable. Mar 95

★★ **Nikon Coolprint, Nikon Electronic Imaging, 516/547-4355, \$2350.** Color dye-sub printer is a good way to make small color proofs of digital images (only A6 paper is supported). It's fast, but print quality suffers from a low resolution and poor color matching. Sep 95

★★★★ **Phaser 140, Tektronix, 503/627-7111, \$1695.** If you're looking for a capable color printer for a small workgroup, this ink-jet is a great choice. It provides only 17 resident fonts, however. Apr 95

★★★★ **Pictura 310, Fargo Electronics, 612/continues**

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Star Ratings

941-9470, \$4995; optional Adobe Level 2 PostScript package \$795. This tabloid-size thermal-wax and dye-sub printer is affordable and produces acceptable print quality, but it's not to dye for. Its color-matching capabilities don't measure up to those of its competitors. **Jul 95**

★★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, \$1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other printer in the price range. But with expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. **Jan 95**

★★★★ **StyleWriter 1200, Apple Computer, 408/996-1010, \$269.** Newest model of Apple's inexpensive ink-jet printer offers improved print quality, better halftones, tiled layouts, and four new fonts. **Sep 95**

★★★★ **Stylus Color, Epson America, 310/782-0770, \$699.** This color ink-jet printer is no speed demon at 720-dpi resolution, you need special paper for high-res output, and it offers no color correction. But who cares? The print quality is superb and the price is reasonable. **May 95**

SCANNERS

★★★★ **Fujitsu ScanPartner Jr., Fujitsu Computer Products of America, 408/432-6333, \$499.** Compact scanner with good OCR software makes converting hard-copy documents to editable text a snap. It's an economical and fuss-free scanning solution, but its page-feeder doesn't offer the flexibility of a flatbed scanner. **Jul 95**

★★ **Pro Imager 4000, PixelCraft, 510/562-2480, \$2995.** This midrange scanner delivers excellent highlight detail but produces a lot of noise in shadow areas.

It doesn't measure up to similarly priced competitors in speed or image quality. **Jun 95**

★★★★ **Pro Imager 8000, PixelCraft, 510/562-2480, \$12,995.** Demanding prepress users will like this scanner's tonal sensitivity, high resolution, large image area, and impressive speed. Although its color-adjustment software needs work, this is a superb scanner. **Jun 95**

★★★★ **Reli 4830T, Relisys, 408/945-9000, \$1699.** The good: high-quality scans, midrange price; lots of bundled software. The bad: slow performance, quirky scanning software. The upshot: If you can live with the cons, this scanner is a bargain. **Jun 95**

★★★★ **SprintScan 35, Polaroid, 617/386-2000, \$2495.** Compact, efficient scanner offers a cost-effective way to transfer images from 35mm slides or negatives to a Mac. **Jun 95**

★★★★ **Vista-S8, Umax Technologies, 510/651-8883, \$995 (LE+); \$1095 (Pro+).** This 24-bit color flatbed scanner has a lot of useful features for its low price, including crisp line-art scans and speedy previews. It's a bargain if you can overlook its slow OCR scanning and some scanning-software bugs. **Jul 95**

SYSTEMS/STORAGE

★★★★ **Brainstorm Accelerator for the Macintosh SE, Brainstorm Products, 415/988-2900, \$199.** Your SE will never be a Power Mac or even a IIx, but if your budget won't buy a new Mac, you can't do better than this accelerator. **Mar 95**

★★★★ **Envoy Wireless Communicator, Motorola, 800/894-7353, \$1000 to \$1500.** With its

intelligent mail agents and well-integrated RadioMail software, this Magic Cap-based PDA was our reviewers' first choice for sending and receiving E-mail. **Aug 95**

★★★★ **Gear 2.5, Elektrosen, 610/617-0850, \$799.** This CD-Recordable mastering software is a mixed bag. It's speedy and reliable, but it can't record HFS CD-ROMs from just a portion of a hard drive without additional software. **Sep 95**

★★★★ **Joule System, La Cie, 503/520-9000, Price varies by component.** Plug-and-play tower lets you stack drives—hard drives, removable media, and others—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers. Joule drive prices are generally slightly higher than for comparable drives. **Feb 95**

★★★★ **Marco Wireless Communicator, Motorola, 800/894-7353, \$900 to \$1400.** This Newton OS-based PDA includes a radio modem. The RadioMail service offers E-mail, paging, outgoing faxes, and a news service, but it's pricey. **Aug 95**

★★★★ **Master CD Pro, MicroNet Technology, 714/453-6000, \$4995.** With support for multiple formats, this quad-speed, multisession, recordable CD-ROM drive is a good tool for professional CD production. It ain't cheap, though. **Aug 95**

★★★★ **MessagePad 120, Apple Computer, 408/996-1010, \$599, 2MB model \$699.** Apple's PDA offers about three times the storage space of the other PDAs tested, and its design is great, but handwriting recognition still needs work. With support for vertical applications, it's good for specialized tasks like medical work. **Aug 95**

★★★★ **Power 100, Power Computing, 512/continues**

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258-1350, \$2599 (base model). The first Macintosh clone offers all the power of a Macintosh 8100/100 for about \$700 less. It offers the speed, expandability, functionality, and compatibility Macintosh users expect, with the customer support and prices we've wanted for so long. Aug 95

★★ **PowerBook 150, Apple Computer, 408/996-1010, \$1449.** Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist. Dec 94

★★★ **Power Macintosh 8100/110, Apple Computer, 408/996-1010, \$6379.** High-end users who have invested heavily in NuBus cards can protect their investment with this top-of-the-line Power Mac. Mar 95

★★★ **Quadra 630, Apple Computer, 408/996-1010, \$1279.** Fast, inexpensive, expandable 33MHz 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

★★ **RCD-1000, Pinnacle Micro, 714/727-3300, \$1695.** The software for this CD-Recordable drive is easy to use, but it's too unreliable to use as a day-to-day backup system. Jun 95

★★★ **SledgeHammer8000FT, FWB, 415/325-4392, \$23,599.** This fault-tolerant RAID Level 5 array will help you maintain constant access to your stored information. Our reviewer couldn't tolerate a few of its faults, however, including its lack of support for RAID 3. Sep 95

★★★ **Sony Magic Link, Sony, 800/571-7669, \$699.95.** Using this PDA for short E-mail messages, phone calls, and appointment scheduling is a breeze, but only a handful of applications have been developed for it so far. Although the Personal Link messaging service is relatively inexpensive, its Telescript support is limited to other devices

that use the Magic Cap OS. Aug 95

★★★★ **Zip Drive, Iomega, 801/778-1000, \$199.95; 100MB cartridge \$19.95.** Weighing in at about a pound, this external drive combines speedy performance, convenience, and economy in an attractive package. It uses 100MB cartridges the size of a floppy disk, and boasts near hard-drive speeds. What's not to like? Jul 95

VIDEO/DISPLAY

★★★★ **Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, \$509.** The tritron tube of this 15-inch monitor provides a sharp and accurate image, but reflects some glare. The built-in stereo speakers reproduce sound nicely. Feb 95

★★★ **EAsycolor 24/1360, EA Research, 510/867-0967, \$1699.** Video board offers Photoshop CMYK-mode acceleration and high-resolution support for multisynchronous monitors. Its software is minimal and its QuickDraw acceleration only adequate, but it's an affordable solution. Aug 95

★★★★ **FlexCam, VideoLabs, 612/988-0055, \$595.** Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

★★★★ **Multiscan 15sf, Sony Computer Peripheral Products, 408/432-0190, \$569.95.** Trinitron monitor has a flat screen that displays sharp, bright, and accurate images. With good antiglare coating and adjustable image tilt, it's worth looking at. Feb 95

★★★★ **MultiSync 3V Monitor, NEC Technologies, 708/860-9500, \$495.** With a bright display and great image quality, this monitor delivers a fine picture at

a moderate price. Feb 95

★★★ **PaintBoard Prism GT, RasterOps, 408/562-4200, \$999.** If you want QuickDraw acceleration and plentiful software options, this video board is a good choice, but it doesn't offer Photoshop acceleration. Aug 95

★★★★ **Panelight ZX, Panelight Display Systems, 415/772-5800, \$3995 to \$4695.** LCD panel offers vivid images at a comparatively low price. It's a great choice for presenters. Mar 95

★★★ **QA-1500, Sharp Electronics Corporation, 201/529-8731, \$5795.** LCD panel's display is crisp and flicker-free, but placing a presentation on its PC Card is cumbersome. Cheaper products are available. May 95

★★★★ **QuickCam, Connectix Corp., 415/571-5100, \$149.95.** For as little as \$99 (street price), this tiny, fun, easy-to-use, digital video camera lets users experiment with video input for making QuickTime movies or capturing still images. Mar 95

★★★★ **SpigotPower AV, Radius, 408/541-6100, \$999.** Make full-screen, 30-fps movies with this first-rate video-compression-and-decompression board and accompanying JPEG software. Jun 95

★★★★ **Thunder IV GX 1360, Radius, 408/434-1010, \$2999.** With its impressive QuickDraw and Photoshop acceleration and versatile software, this video board was our reviewer's first choice. It's more expensive than the competition, however. Aug 95

★★★ **VideoDirector 1.5, Gold Disk, 408/782-0200, \$199.95.** Low-end video-editing system lets you log, edit, and organize videotape footage, copying selections from a source deck to a record deck. A good choice for nonprofessionals. Jun 95

The fastest way to run DOS and Windows on your Power Macintosh

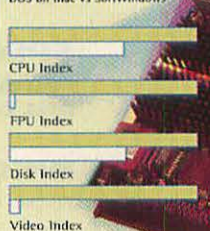
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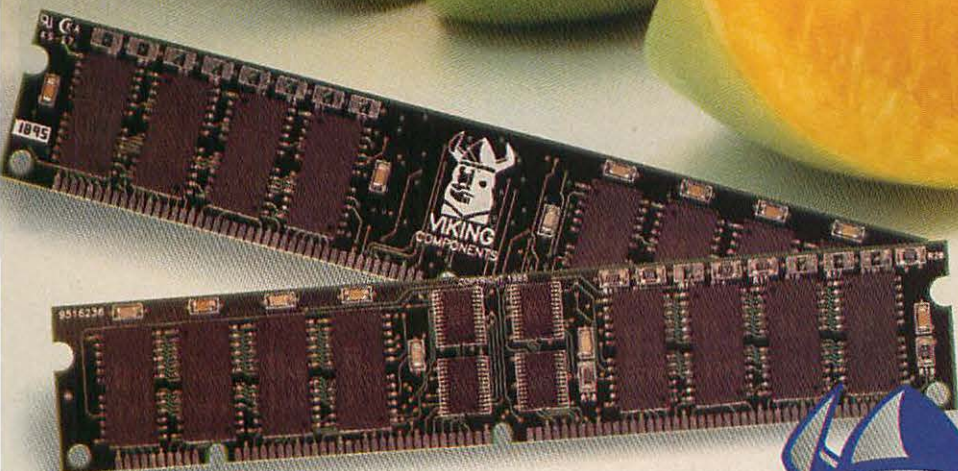
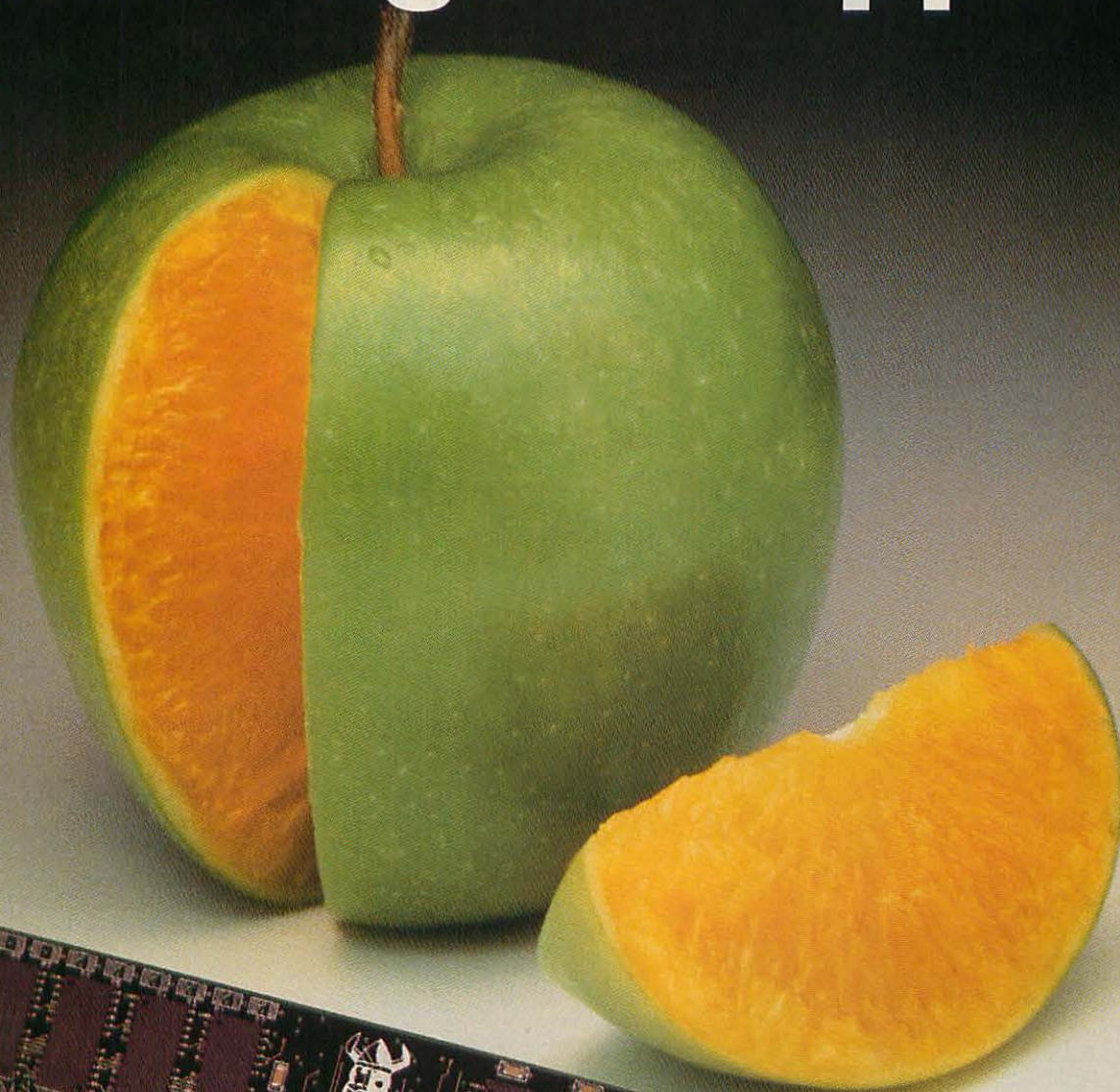
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SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an **Editors' Choice**, or have won a **World-Class** award. In some cases, the editorial evaluation quoted is for an earlier product version. The Ⓢ symbol indicates that the product is Power Mac related. Except where otherwise indicated, prices given are suggested retail prices.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

3M Formatted Optical Disks + DOS Mounter 5.0

DTP Direct is offering a free copy of Software Architects' \$95 file-interchange software to customers who order 3M Mac- and DOS-formatted optical disks. DOS Mounter automatically mounts DOS-formatted disks to your Macintosh desktop. Call 800/890-9374 for more information and to order.

Ⓢ **ArchCAD PayPerUse 4.5 + Vision 3d 4.0** A bundle for architects and interior designers consisting of Strata's \$695 3-D modeler/renderer (Jul 95 ★★★★★) and the PayPerUse version of Graphisoft's \$4450 architectural CAD software (Jun 92 ★★★★★ for 680X0 version 4.02) is being offered for \$1079. ArchCAD PayPerUse employs a metering device allowing the user to pay only for the actual time the program is in use. Call 415/737-8665, ext. 672, for more information.

Conflict Catcher 3 + RAM Doubler 1.5.2 Mac-Connection is offering a bundle consisting of Casady & Greene's \$99.95 extension-management utility (Sep 95 ★★★★★) and Connectix's \$99 RAM-enhancement utility (May 94 ★★★★★ and June 94 "Virtual Memory Realities" **Editors' Choice** for version 1.0.1) for \$79.95. Call 800/800-1111 to order (#23288). Offer expires 12/31/95.

Digital Box Office + KPT Bryce + Fractal Design Poser + Virtus VR PowerProduction Software is offering a \$799 Now Showing bundle that includes the following products along with its \$599 Digital Box Office (a new interactive game and multimedia authoring tool): HSC Software's \$199 3-D landscape-rendering program (Dec 94 ★★★★★ for KPT Bryce 1.0), Fractal Design's \$199 3-D human-figure design tool (Oct 95 ★★★★★ for Poser 1.0), and Virtus Corporation's \$99 Virtus VR 3-D world builder. Call PowerProduction at 310/937-4411 for more information.

Ⓢ Macromedia FreeHand 5.0 + KPT Vector Effects 1.0

A bundle consisting of Macromedia's \$595 draw program (May 95 ★★★★★) and HSC Software's \$199 filter set of plug-ins for Mac drawing applications (Oct 95 ★★★★★) is available for \$419 through all major resellers and mail-order companies. Call 800/989-3762 for more information. Offer expires 9/30/95.

Ⓢ Persuasion 3.0.2 + Adobe Type Twister 1.0 + 220 Adobe Typefaces

Adobe Systems is offering a CD-ROM version of its \$395 presentation graphics program (Sep 94 ★★★★★ for 680X0 version 3.0). The CD-ROM includes a CD Bonus Pack consisting of textures, clip art, Auto-Templates, stock photos, and backgrounds. Like the disk version, it also includes the \$29.95 Adobe Type Twister 1.0 (Jan 95 ★★★★★), \$60 Adobe Type Manager 3.8.2, Adobe Acrobat Reader, and a PostScript driver. Adobe's \$69 Type On Call CD-ROM inventory of 2000 typefaces is bundled as well; it includes free access to 220 Type 1 faces valued at \$5500. Call 800/521-1976 for more information.

SIDEGRADES/UPGRADES

MacLAN Connect 5.5

Miramar Systems is offering this Windows 95-compatible \$99 upgrade of its \$199 Apple-Talk software for Intel-standard PCs to users who purchased version 5.0 prior to 8/1/95, for \$59. Call 805/966-2432 for more information. Offer expires 10/31/95.

Media 100 System Data Translation is offering this PCI-based upgrade to its \$10,995 digital video system, plus a \$3995 optional package for special effects and edit-decision lists, to owners of Avid Technology's Media Suite Pro for \$4995. Call 800/832-8188 for more information. Offer expires 9/29/95.

QuickTake 150 Apple Computer is offering QuickTake 100 digital camera users an upgrade to QuickTake 150 functionality (see Sep 95 "Filmless Wonders") for \$199. The upgrade includes close-up lens, PhotoFlash 2.0 software, double storage capacity, lithium batteries, and improved image quality. Call 800/399-5111 to order. Offer expires 11/30/95.

Ⓢ **WordPerfect 3.5 for Macintosh** Novell is offering this \$189 word processor (Mar 94 ★★★★★ for 680X0 version 3.0) on disk or CD-ROM for \$89 to users of any competing word processor or any Works or Macintosh suite product. The CD-ROM version includes Envoy 1.0a, the portable document publisher and viewer; AppWare 1.2, a cross-application integration tool (Oct 95 ★★★★★); and additional templates, macros, and clip art. Call 800/451-5151 for more information.

SPECIAL DISCOUNTS/REBATES/OFFERS

CommuniGate Stalker Software is offering a 50 percent introductory discount on this integrated client-server mes-

saging system, which provides network and remote users with LAN E-mail as well as multiline fax, voice, and Internet messaging. Other modules, including SMTP and Pager, will be available in the third quarter. A free full-function trial version that supports five users is available for downloading in the file sections of America Online, eWorld, and CompuServe, as well as from major Internet FTP sites. Licenses for 25 users or unlimited users will retail at \$200 and \$600 respectively, while licenses for fax, voice, Internet E-mail, and multiline capabilities will retail for \$100 each once this offer expires. Call (800/262-4722) or E-mail (sales@stalker.com) for more information. Half-price offer expires 11/30/95.

Fast and Wide SCSI-2 PCI Card Optima Technology is offering this \$499 PCI card for \$398 to owners of any of its hard drive and array products, and for \$295 to owners of its NuBus accelerators. Call 714/476-0515 for more information.

microLaser Pro Series Printers Texas Instruments is offering a \$100 rebate to customers who purchase any of three printer models between 8/1/95 and 9/30/95. The 8-ppm microLaser Pro 600, 12-ppm microLaser Pro E, and 12-ppm PowerPro network printer have estimated street prices of \$900, \$1400, and \$1660, respectively. To take advantage of this offer, log on to TI's printer home page (type <http://www.ti.com/printer> at the Internet Resource Locator), which contains the claim form to accompany the eligible printer sales receipt. Offer expires 9/30/95.

Oracle Media Objects Oracle is offering a \$495 multimedia development environment that uses a stack-based metaphor to let users create interactive applications for CD-ROM, kiosks, and narrowband and broadband networks. Users can download free 90-day trial copy (<http://www.oracle.com>). Fully supported copy available for \$99 directly from Oracle by calling 800/633-0726. Offer expires 12/31/95.

QuickBooks Pro Intuit is offering QuickBooks or QuickBooks users a \$50 rebate on this new \$189 small-business accounting product that integrates time tracking, estimating, and job costing with accounting and payroll. Call 800/624-8742 for more information.

Ⓢ **SPSS 6.1 for Macintosh** SPSS is offering this Power Mac version of its \$695 statistical software package (base module) for an introductory price of \$495, as well as a \$100 discount on any of SPSS's five add-on modules, priced from \$395 to \$495 each (modules include Professional Statistics, Advanced Statistics, Tables, Categories, and Trends). Call 800/543-2185 for more information. Offer expires 9/30/95; valid only in the United States and Canada.

Ⓢ **WorldWrite 3.0** WorldSoft is offering this new \$149 word processor for an introductory price of \$99. A \$199 WorldScript-savvy version, which offers complete multilingual capabilities, including right-to-left languages and vertical input of Asian two-byte languages, is available for \$149. Call WorldSoft (800/225-9299) for more information and to order. Offer expires 12/31/95. **m**

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Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)

- 01 ☐ 1000+
02 ☐ 999 - 100
03 ☐ 99 - 25
04 ☐ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

- 05 ☐ Apple Workgroup Servers/
Mac Quadra-series
06 ☐ Mac Centris-series/II-series/LC III/
Performa 600/450/SE 30
07 ☐ Mac LC/LC II/Performa 430/405/
400/200/Classic-series/SE/Plus/
512K/128K/Portable
08 ☐ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/or services? (Check one.)

- | | | |
|-----------|-----------------------------|-----------------------------|
| 500+ | <input type="checkbox"/> 09 | <input type="checkbox"/> 15 |
| 499 - 100 | <input type="checkbox"/> 10 | <input type="checkbox"/> 16 |
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| 9 - 1 | <input type="checkbox"/> 13 | <input type="checkbox"/> 19 |
| None | <input type="checkbox"/> 14 | <input type="checkbox"/> 20 |

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ☐ Initiate/Determine need for product/capabilities/features
22 ☐ Evaluate, recommend, or approve brands/models
23 ☐ Evaluate, recommend, or approve purchase source
24 ☐ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ☐ \$1 million or more
26 ☐ \$999,999 - \$500,000
27 ☐ \$499,999 - \$100,000
28 ☐ \$99,999 - \$50,000
29 ☐ \$49,999 - \$10,000
30 ☐ Under \$10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ☐ Business software (Word processing, spreadsheet, database, etc.)
32 ☐ Graphics/publishing software
33 ☐ Monitors/displays
34 ☐ Printers/scanners
35 ☐ Networking/communications hardware and/or software
36 ☐ Multimedia/AV hardware and/or software
37 ☐ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ☐ Computer Reseller/VAR/VAD
39 ☐ MIS/DP/IS/Network Management
40 ☐ Engineering
41 ☐ R&D/Scientific
42 ☐ Corporate/General Management
43 ☐ Accounting/Finance
44 ☐ Marketing/Sales/PR/Communications
45 ☐ Art/Design/Creative Services

Thank You!

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Co. _____

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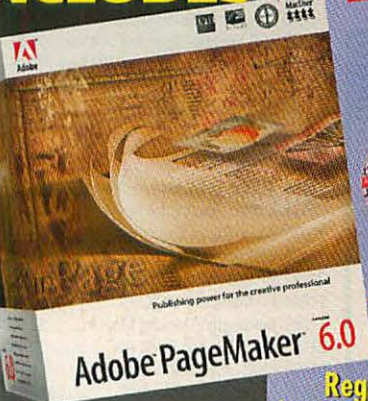
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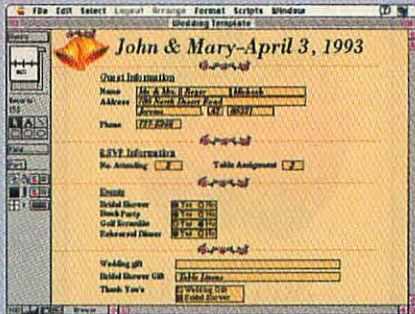


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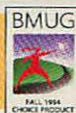
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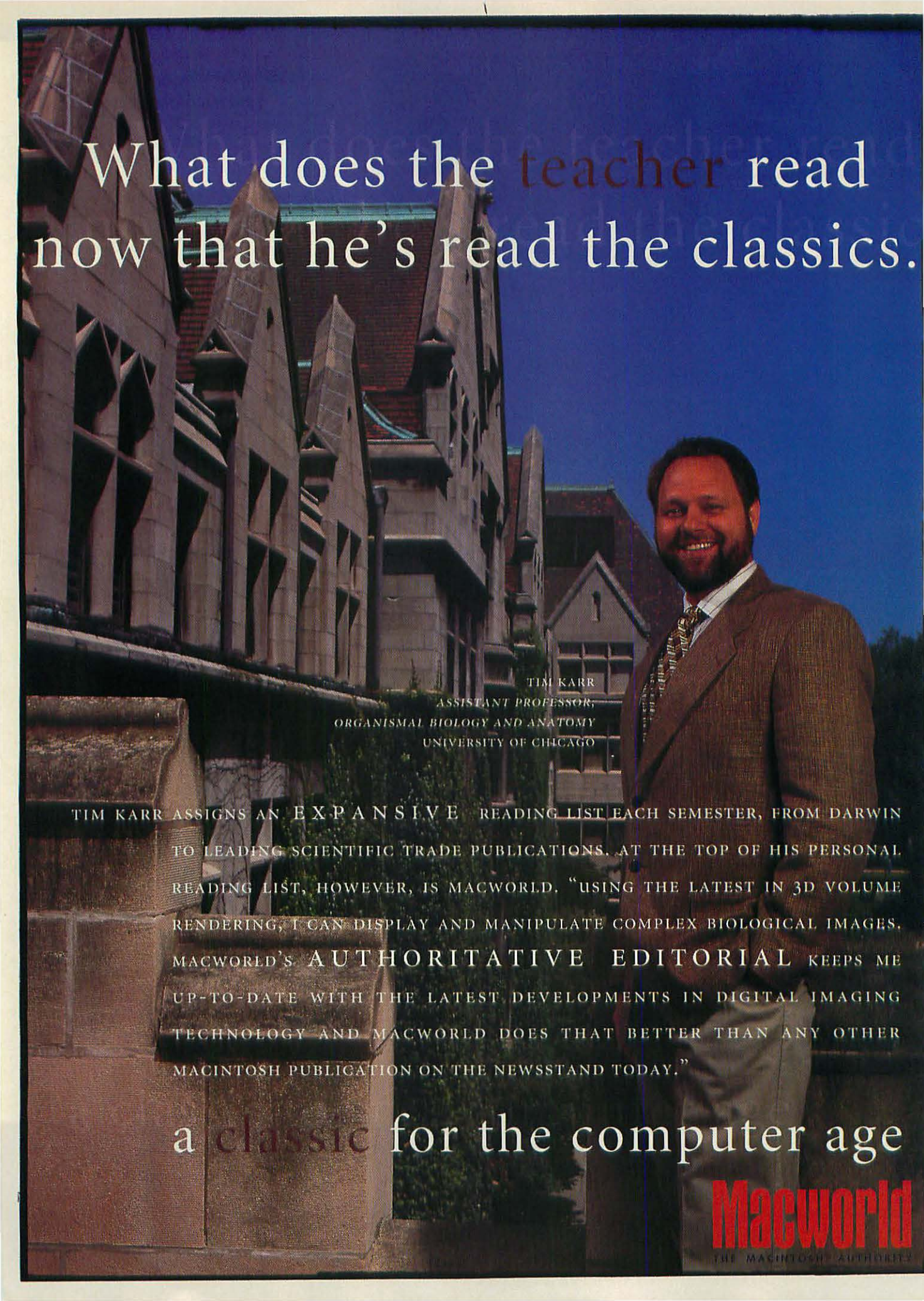


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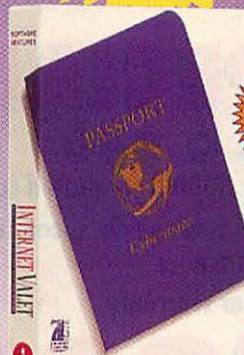
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Quantum 840 Trailblazer			
APS Q 1080 ³	1042MB	389.95	489.95
Quantum 1080 Fireball			
APS ST 1.0 ⁵	1010MB	499.95	599.95
Seagate ST 31230N Hawk			
APS Q 1.0 ⁵	1025MB	699.95	799.95
Quantum Atlas XP31070			
APS MS 2.0 ⁵	1955MB	899.95	999.95
Micropolis 4221			
APS ST 2.0 ⁵	2047MB	999.95	1099.95
Seagate ST 32550N Barracuda			
APS Q 2.0 ⁵	2050MB	899.95	999.95
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APS MS 2.0AV ⁵	1955MB	999.95	1099.95
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APS Q 4.0 ⁵	4101MB	1399.95	1499.95
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APS MS 9.0 ⁵	8669MB	2199.95	2399.95
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†Native capacity without data compression.

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DLT40 Data cartridge	109.95	—	—
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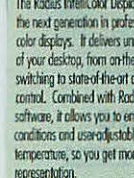
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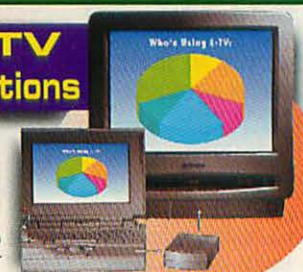
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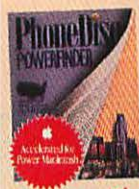
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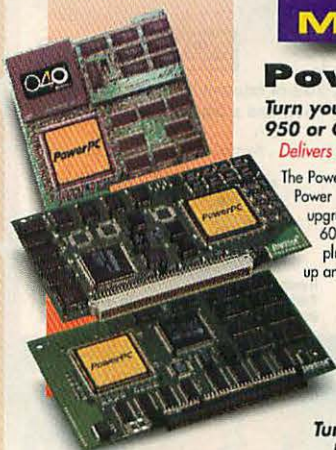
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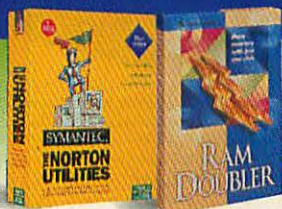
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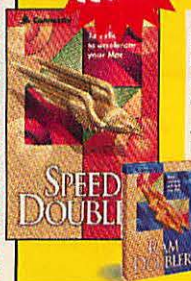
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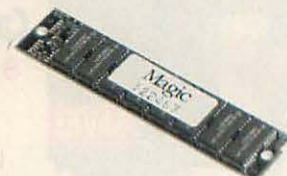
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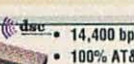
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VIDEO CARDS	RESOLUTION	PRICE
Radius Thunder 24	1152x870	\$799
Radius Thunder II Series IV GX 1152	1152x870	\$1819
Radius Thunder II Series IV GX 1360	1360x1024	\$2239
Radius Thunder II Series IV GX 1600	1600x1200	\$2769
Radius ThunderColor 30/1152 (PCI)	1152x870	\$1589
Radius ThunderColor 30/1360 (PCI)	1600x1200	\$1989

NOMAI
44MB CARTRIDGES
20 FOR \$499!

SYQUEST CARTRIDGES

CARTRIDGES	PRICE
270MB Cartridges (5+ or with drive purchase)	\$56
200MB Cartridges (5+ or with drive purchase)	\$70
105MB Cartridges (5+ or with drive purchase)	\$48
88MB Cartridges (5+ or with drive purchase)	\$37/45
44MB Cartridges (5+ or with drive purchase)	\$29/39

OPTICAL CARTRIDGES

3.5" OPTICAL	PRICE
Sony 128MB	\$29
dsc 128MB	\$17
Komag 128MB	\$24
Verbatim 128MB	\$18
dsc 230MB	\$25
Komag 230MB	\$28
Sony 230MB	\$39

5.25" OPTICAL	PRICE
Sony 600/650MB	\$75
DSC 600/650MB	\$59
Komag 600/650MB	\$69
Tahiti II 1GB	\$159
Komag 1.0GB	\$81
Philips 1.3GB	\$69
dsc 1.2/1.3GB	\$79
Maxoptix 1.2/1.3GB	\$83
Sony 1.2/1.3GB	\$85

OPTICAL DRIVES

• High 2.0MB p/s transfer rate
• Economical storage of large color images and digital audio/video data

SONY 1.3GB \$1699!

5.25" DRIVES	CAPACITY	SEEK	MACKIT	dsc
Sony 650	650MB	19ms	\$999	\$1049
Ricoh 650EX	650MB	25ms	\$899	\$949
MaxOptix-Tahiti II	1.0GB	25ms	\$1299	\$1349
MaxOptix-Tahiti III	1.3GB	25ms	\$1989	\$2039
Ricoh 1.3GB Turbo	1.3GB	24ms	\$1479	\$1529
Sony 1.3GB	1.3GB	25ms	\$1699	\$1749

FREE! Global Village Teleport Bronze with every optical drive!

OLYMPUS 128 \$319!

3.5" DRIVES	CAPACITY	SEEK	MACKIT	dsc
Olympus 128	128MB	35ms	\$319	\$369
Panasonic 128	128MB	35ms	\$299	\$349
Fujitsu-230	230MB	30ms	\$569	\$594

SONY SDT-5000 \$939!

• Built in data compression
• 16GB per 120 meter tape
• Low cost, dependable backup

FREE! 72 hour Replacement Guarantee with any tape drive purchase!

MODEL	CAPACITY	SIZE	MACKIT	dsc
Sony SDT-2000	2GB	3.5"HH	\$689	\$739
Sony SDT-4000	8GB	3.5"HH	\$789	\$839
Sony SDT-5000	5-16GB	3.5"HH	\$889	\$939
Exabyte 8200	2GB	5.25"FH	\$1199	\$1249
Exabyte 8500XL	5GB	5.25"FH	\$1899	\$1949
Exabyte 8205XL	2-5GB	5.25"HH	\$1389	\$1439
Exabyte 8505XL	5-10GB	5.25"HH	\$2119	\$2169

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo model includes Retrospect and 72-hour warranty repair.

SYQUEST 200MB \$345!

• High speed—15ms access time!
• 5.25" format
• Compatible with SyQuest 44, 88 and 200MB cartridges
• Meets the requirements of image processing professionals

SYQUEST DRIVES
Turbo-charged SyQuest Drives!

MODEL	INTERNAL	EXTERNAL	dsc
SyQuest 270	\$360	\$400	\$425
SyQuest 200	\$345	\$385	\$410
SyQuest 105	\$105	\$145	\$170
SyQuest 88C	\$250	\$290	\$315
SyQuest 44	\$125	\$155	\$180

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo model includes FWB Hard Disk Toolkit and 72-hour warranty repair.

MULTIFUNCTIONAL DRIVES
Archive 525 /540MB HD COMBO \$599!

• Up to 6 devices in the same enclosure!
• Costs less than individual drives
• Quick setup. Only one cable!
• Promotes data security. Just lock it away after hours.

MULTIFUNCTIONAL	PRICE
SyQuest 200 /540MB hard drive	\$669
Sony SDT 5000 /2.0GB Quantum	\$1899
Sony 650MB Optical /SyQuest 200	\$1199
Olympus 3.5" optical /Nikon Coolscan	\$1899
SyQuest 88C /650MB optical drive	\$1099
SyQuest 88C /NEC 3X CD ROM /540MB HD	\$979
Archive 525 Tape drive /540MB hard drive	\$599
NEC 3X CD-ROM /1.3GB optical drive	\$1799
4.0GB Quantum HD /Nikon CoolScan	\$2679

Includes external drive, 25/50 SCSI Cable, terminator, Mac SW and 72-hour warranty repair.

DSC QUAD SPEED \$299!

CD-ROM DRIVES

• Quad speed
• Supports PhotoCD and MPC
• Includes FWB CD Toolkit FREE!

MODEL	PRICE
DSC Quad Speed	\$299
Toshiba 3501 QuadSpeed	\$375
Apple 300e Plus	\$299
NEC MultiSpin 4Xe	\$459
CD-ROM Special (with CD-ROM drive purchase)	\$59

CD ROM RECORDERS
PM CDR-1000 \$1799!

MODEL	PRICE
PinnacleMicro CDR-1000	\$1799
Yamaha 4-Speed CD-ROM Recorder	\$3369

HARD DRIVES
NEW!
FWB Hard Disk Toolkit. \$59 Value!

dsc Turbo Drives
Now even faster!
Turbo models have guaranteed 72-hour replacement plus FWB Hard Disk Toolkit—FREE!

TURBO SEAGATE ELITE 3 \$1299!

Quantum	MODEL	ACCESS	INTERNAL	EXTERNAL	dsc
85MB Go	Daytona	17ms	\$159	\$279	\$304
256MB Go	Daytona	17ms	\$184	\$304	\$329
341MB Go	Daytona	17ms	\$289	\$409	\$434
512MB Go	Daytona	17ms	\$374	\$454	\$479
42MB	Maverick	17ms	\$79	\$139	\$164
85MB	Maverick	17ms	\$110	\$170	\$195
270MB	Maverick	14ms	\$140	\$200	\$225
365MB	Lightning	11ms	\$145	\$205	\$230
540MB	Maverick	14ms	\$185	\$245	\$270
540MB	Lightning	11ms	\$195	\$255	\$280
730MB	Lightning	11ms	\$215	\$275	\$300
1.0GB	Fireball	9.5ms	\$338	\$398	\$423
1.4GB	Empire	9.5ms	\$659	\$719	\$744
2.1GB	Atlas	9.5ms	\$790	\$850	\$875
4.2GB	Atlas	9.5ms	\$1079	\$1139	\$1164

Seagate	MODEL	ACCESS	INTERNAL	EXTERNAL	dsc
1.0GB	Hawk 1	9ms	\$509	\$569	\$619
2.1GB	Hawk 2LP	9ms	\$839	\$899	\$924
2.1GB	Barracuda 2LP	8ms	\$1029	\$1089	\$1114
2.1GB	Barracuda 2W*	8ms	\$1129	\$1189	\$1239
4.3GB	Hawk 4LP	9ms	\$1135	\$1195	\$1245
4.3GB	Barracuda 4LP	8ms	\$1479	\$1539	\$1589
4.3GB	Barracuda 4W*	8ms	\$1579	\$1639	\$1689
3.4GB	Elite 3	10ms	\$1189	\$1249	\$1299
9.1GB	Elite 9	11ms	\$2209	\$2309	\$2359

IBM	ACCESS	INTERNAL	EXTERNAL	dsc
160MB	12ms	\$120	\$180	\$205
364MB	12ms	\$169	\$229	\$254
540MB	12ms	\$199	\$259	\$284
730MB	11ms	\$225	\$285	\$310
1.0 GB	11ms	\$499	\$559	\$584
2.0 GB	11ms	N/A	\$799	\$824

FUJITSU	ACCESS	INTERNAL	EXTERNAL	dsc
540MB	9ms	\$199	\$259	\$284
1.2GB	9ms	\$469	\$529	\$554
2.1GB	9ms	\$859	\$919	\$944

For Active Termination, add \$29. Additional 50/50 SCSI cables, \$15 each.
Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo models include FWB Hard Disk Toolkit, active terminator and 72-hour warranty repair.
* Fast/Wide drives require ATTO SE IV SCSI interface card at \$895

DISK ARRAYS
dsc 4.0GB Array \$2299!

• Supports Raid Levels 0 and 1 for disk mirroring and striping
• Speeds up all applications—including VideoVision Studio!

MODEL	DESCRIPTION	ARRAY	VIDEOVISION
dsc 2.0GB Array	(2 x 1.0GB drives)	\$1159	N/A
dsc 4.0GB Array	(2 x 2.0GB drives)	\$2299	\$2599
dsc 8.0GB Array	(2 x 4.0GB drives)	\$2799	\$3499
dsc CD-ROM Array	(6 x QuadSpeed)	\$1299	N/A

Includes external disk array, SCSI Cable, MAC SW and terminator.
*VideoVision Studio support requires ATTO Fast/Wide interface; add \$895



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TWENTY ONE INCH DISPLAYS

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Supports 1600x1200 pixel resolution

Radius PrecisionColor Display 21

- 1600x1200 to 1024x768 • Flat screen
- Razor sharp .28 dot pitch Ideal solution for professionals requiring maximum screen area, color accuracy, and sharpness.

*With qualifying videocard, accelerator, or computer purchase

SuperMac PressView 21

\$2899

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\$799

RasterOps 21 inch Grayscale Display

\$899

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Radius PrecisionColor Display 20v

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- "Best Overall Screen Uniformity"—MacUser

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- Shadow Mask Tube • Built in video support

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Grayscale Pivot

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24 BIT

PCI Cards

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with DSP acceleration

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RasterOps PaintBoard Pro

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RasterOps PaintBoard Turbo XL

\$799

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8 BIT

Radius PrecisionColor 8XJ

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SuperMac DoubleColor LX

\$399

SuperMac Spectrum 8/24 PDQ

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20/19" RESOLUTIONS

24 BIT

PCI Cards

SuperMac Spectrum 24 Series V

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Radius PrecisionColor 24XK

\$499

Radius PrecisionColor Pro 24XK

\$599

SuperMac Futura MX

\$499

RasterOps PaintBoard Lightning

\$CALL

RasterOps Prism 24

\$CALL

8 BIT

SuperMac Spectrum 8 Series III

\$199

17/16" RESOLUTIONS

24 BIT

Radius PrecisionColor 24XP

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Radius PrecisionColor Pro 24XP

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SuperMac Futura SX

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- MacUser Editor's Choice

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Apple Workgroup Server 8150	16	264						319			638	1078	2238
Apple Workgroup Server 9150	16/24	264						319			1038	1078	2238
Apple Power Macintosh 6100/60	8	72	512k	59				298			618	1058	2198
Apple Power Macintosh 7100/66	8	136	512k	59				298			618	1058	2198
Apple Power Macintosh 8100/80	8	264	512k	59				298			618	1058	2198
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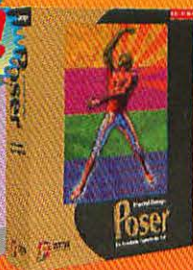
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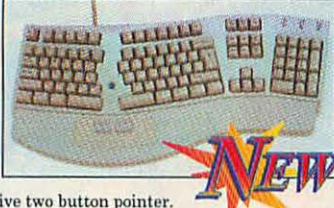


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Conner	1080MB	9ms	5400	256K	5yr	CFP1080S	\$445	\$505
Micropolis	2050MB	8.5ms	7200	512K	5yr	MC4221	\$875	\$935
Micropolis	2050MB	A/V Gold	7200	512K	5yr	MC4221AV	\$945	\$1005
Micropolis	2050MB	WIDE SCSI	7200	512K	5yr	MC4221W	\$1009	\$1109
Conner	2147MB	9ms	5400	512K	5yr	CFP2105S	\$769	\$829
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Seagate	2147MB	9ms	5411	512K	5yr	ST32430N	\$869	\$929
Seagate	2147MB	8ms	7200	512K	5yr	ST32550N	\$989	\$1049
Seagate	2147MB	WIDE SCSI	7200	512K	5yr	ST32550W	\$1159	\$1259
Seagate	4290MB	9ms	5400	512K	5yr	ST15230N	\$1095	\$1155
Seagate	4290MB	8ms	7200	1024K	5yr	ST15150N	\$1459	\$1519
Seagate	4290MB	WIDE SCSI	7200	1024K	5yr	ST15150W	\$1659	\$1759
Micropolis	4294MB	8ms	7200	512K	5yr	MC3243	\$1319	\$1379
Micropolis	4294MB	A/V Gold	7200	512K	5yr	MC3243AV	\$1419	\$1479
Micropolis	4294MB	WIDE SCSI	7200	512K	5yr	MC3243W	\$1459	\$1599
Conner	4294MB	9.5ms	7200	512K	5yr	CFP4207S	\$1129	\$1189
Micropolis	9100MB	12ms	5400	512K	5yr	MC1991	\$2129	\$2229
Micropolis	9100MB	A/V Gold	5400	512K	5yr	MC1991AV	\$2249	\$2349
Micropolis	9100MB	WIDE SCSI	5400	512K	5yr	MC1991W	\$2299	\$2499
Seagate	9090MB	11ms	5400	1024K	5yr	ST410800N	\$2350	\$2450

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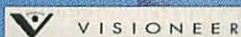


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DSP3053	535 MB	9.5 ms	5400	512K	5 Year	210 270
Fireball	540 MB	10 ms	5400	128K	3Year	185 245
Lightning	730 MB	11 ms	4500	128K	2 Year	245 305
Traillblazer	850 MB	11 ms	4500	128K	3 Year	235 295
Fireball	1080 MB	10 ms	5400	128K	3 Year	365 425
Atlas	2.1 GB	8 ms	7200	1024K	5 Year	875 935
Capella	2.1 GB	8 ms	5400	1024K	5 Year	735 795
Grand Prix	4200 MB	8.6 ms	7200	512K	5 Year	1055 1115
Atlas	4.3 GB	8 ms	7200	1024K	5 Year	1355 1415

Capacity	Size	Access	Cache	Warranty	Int.	Ext.
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Daytona	341 MB	2.5"	17ms	128K	1 Year	245 305
Daytona	514 MB	2.5"	14ms	128K	1 Year	375 435

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M3243	4.3 GB	8.5 ms	7200	512K	5 Year	1295 1355
M1991	9.0 GB	11 ms	5400	512K	5 Year	2095 2195
M4221W	2.1 GB	8.5 ms	7200	512K	5 Year	965 1035
M3243W	4.3 GB	8.5 ms	7200	512K	5 Year	1395 1465
M1991W	9.0 GB	11 ms	5400	512K	5 Year	2199 2299
M4221AV	2.1 GB	8.5 ms	7200	512K	5 Year	915 975
M3243AV	4.3 GB	8.5 ms	7200	512K	5 Year	1325 1385
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Capacity	Seek	RPM	Cache	Warranty	Int.	Ext.
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Hawk 4	4.2 GB	ST15230N	9ms	5400	512K	5 Year 1165 1225
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Barracuda	2.4 GB	ST32550N	8ms	7200	1024K	5 Year 1125 1195
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Elite	9.0 GB	ST10000N	11ms	5400	1024K	5 Year 2350 2450

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HP1533, 60MB/min., 4mm media, 1 Year warranty		
20-50 GB	2995	3095
HP1553, 60MB/min., 4mm media, 1 Year warranty		

Exabyte		
2-5 GB	1395	1485
8205XL, 263KB/sec., 8mm media, 1 Year warranty		
7-14 GB	2130	2190
8505XL, 500KB/sec., 8mm media, 1 Year warranty		

All tape backup drives include 1 piece of media and Retrospect backup software.

MEMORY PRODUCTS

Always call for the most competitive pricing on memory!		
Memory	Centris & Quadra	
2x8x80	4MB 60/70ns	
4x8x80 60/70ns	8MB 60/70ns	
4x8x80FX	16MB 70ns	
16x8x80LowProfile	32MB 60ns	
16x8x80 FX	VRAM 256K/512K	

Powerbook Memory	
520,520c,540,540c	
4MB,8MB,16MB,32MB	
140,170,160,165c,180,180c,Duos	
4MB,6MB,8MB,10MB	
12MB,14MB,20MB	

Lifetime warranty on all memory products!!!

* LIFETIME WARRANTY ON MATH COPROCESSORS, MEMORY MODULES & CPU CHIPS AND GET \$\$\$\$ FOR YOUR OLD ONES!

* NO SALES TAX IN DELAWARE * * FREE TWO DAY DELIVERY ON CPU & MATH COPROCESSORS TO THE 48 STATES *

QUANTUM	Capacity	Seek	Buffer	Warranty	RPM	Size	Internal	External
Lightning	365 MB	11MS	128k	2 Years	4500	3.5	125	205
Trailblazer	420 MB	14MS	128k	3 Years	4500	3.5	185	265
Maverick	540 MB	14MS	128k	2 Years	3600	3.5	195	275
Fireball	545 MB	12MS	128k	3 Years	5400	3.5	205	285
Lightning	541 MB	11MS	128k	2 Years	4500	3.5	204	284
Lightning	730 MB	11MS	128k	2 Years	4500	3.5	255	335
Trailblazer	850 MB	14MS	128k	3 Years	4500	3.5	269	349
Fireball	1080 MB	12MS	128k	3 Years	5400	3.5	435	515
Atlas	1075 MB	8MS	1024k	5 Years	7200	3.5	775	855
Atlas	2150 MB	8MS	1024k	5 Years	7200	3.5	985	1065
Capella	2216 MB	8.5MS	512k	5 Years	5400	3.5	839	919
Grand Prix	4300 MB	8.6MS	512k	5 Years	7200	3.5	1149	1229
Atlas	4300 MB	8 MS	1024k	5 Years	7200	3.5	1449	1529

MICROPOLIS	Capacity	Seek	Buffer	Warranty	RPM	Size	Internal	External
3221	2050 MB	8.9MS	512k	5 Years	7200	3.5	949	1029
3221 A/V	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
4221	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
4221 A/V	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
4221 WIDE	2050 MB	8.9MS	512k	5 Years	7200	3.5	1059	1139
3243	4294 MB	8.9MS	512k	5 Years	7200	3.5	1329	1399
3243 A/V	4294 MB	8.9MS	512k	5 Years	7200	3.5	1419	1499
3243 WIDE	4294 MB	8.9MS	512k	5 Years	7200	3.5	1459	1539
1991	9091 MB	12 MS	512k	5 Years	5400	5.25	2139	2239
1991 A/V	9091 MB	12 MS	512k	5 Years	5400	5.25	2249	2349
1991 WIDE	9091 MB	12 MS	512k	5 Years	5400	5.25	2299	2399

SEAGATE	Capacity	Seek	Buffer	Warranty	RPM	Size	Internal	External
ST31200N	1050 MB	9MS	512k	5 Years	5400	3.5	565	645
ST31230N	1050 MB	9MS	512k	5 Years	5400	3.5	519	599
ST31230W	1050 MB	9MS	512k	5 Years	5400	3.5	649	729
ST32550N	2147 MB	8MS	512k	5 Years	7200	3.5	989	1069
ST32550W	2147 MB	8MS	512k	5 Years	7200	3.5	1159	1239
ST15150N	4294 MB	8MS	1024k	5 Years	7200	3.5	1479	1559
ST15150W	4294 MB	8MS	1024k	5 Years	7200	5.25	1590	1660
ST410800N	9090 MB	11MS	1024k	5 Years	5400	5.25	2349	2429
ST410800W	9090 MB	11MS	1024k	5 Years	5400	5.25	2399	2479

MATH COPROCESSORS & CPU UPGRADES

68040RC40 w/MMU & FPU 39
68040RC33 w/MMU & FPU 34
-for LC 575 & Quadra 650
68040RC25 w/MMU & FPU 27
- for Centris, Performa
475,476 & LC475,Quadra
605, 610, 650 & 660AV
68030RC50 PGA w/MMU 11
68030RC40 PGA w/MMU 10
68030RC33 PGA w/MMU 7
68030RC25 PGA w/MMU 4
68882RC50 PGA FPU 9
68882RC40 PGA FPU 8
68882RC33 PGA FPU 5
68882RC25 PGA FPU 4
68882FN40 PLCC FPU 13
68882FN33 PLCC FPU 5
68882FN25 PLCC FPU 4
68040 Heat Sink 1
68040 Heat Sink & Fan 4

MEMORY UPGRADES

LC III - 475 - 550 - 575
Quadra 605 - 610 - 650 - 950
- 660av - 840av
Power Mac 6100 - 7100 - 8100

72 PIN SIMMS

32bit 4MB 1x32 80NS 13
32bit 4MB 1x32 70NS 14
32bit 4MB 1x32 60NS 15
32bit 8MB 2x32 80NS 27
32bit 8MB 2x32 70NS 28
32bit 8MB 2x32 60NS 29
32bit 16MB 4x32 80NS 47
32bit 16MB 4x32 70NS 48
32bit 16MB 4x32 60NS 49
32bit 32MB 8x32 80NS 89
32bit 32MB 8x32 70NS 94
32bit 32MB 8x32 60NS 99
32bit 64MB 16x32 70 or 60ns 224

30 PIN SIMMS

1x8 1MB 150ns - 60ns 32
2x8 2MB 150ns - 60ns 64
4x8 4MB 150ns - 60ns 128
8x8 8MB 150ns - 60ns 256
16x8 16MB 150ns - 60ns 512

168 PIN DIMMS

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16MB 6
32MB 11

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SQ 5200C DRIVE 200MB 5.25" 399
SQ 3270S DRIVE 270MB 3.5" 399
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88 MB CARTRIDGES 51
105 & 270 MB CARTRIDGES 59
200 MB CARTRIDGES 79
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POWER BOOK

Quantum 2.5" Hard Drives
Daytona 256MB 17ns 229
Daytona 341MB 17ns 299
Daytona 514MB 17ns 379
500 Series Memory
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8 Megabyte Upgrade 315
16 Megabyte Upgrade 619
24 Megabyte Upgrade 999
32 Megabyte Upgrade 1229

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NEC 3xp External Portable	150MS	256k	450k/sec	279
Toshiba 4.4x Int / External	140MS	256k	660k/sec	329/409
Plextor 4x Int / External	150MS	1024k	600k/sec	415/495
Plextor 6x Int / External	145MS	256k	900k/sec	499/579

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 "I tried...Direct Connections...configurations without encountering any problems" **Video Pro April '95**
 "This array is the one to beat." **Ken Grey Writer for WIRED, Computer User, MovieMaker, Computer Video, and Digital Video Magazine.**
 "Stick with a vendor such as Direct Connections that understands how to prepare a RAID for desktop video." **MacWorld April '95**



HARD DRIVES

Seagate Elite 9 gig **\$2495.**

514MB - 1200MB

5 YEAR WARRANTY

RAND/MODEL	CAPACITY	SIZE	ACCESS	RPM	INTERNAL	EXTERNAL
QUANTUM*	514MB	2.5"	14MS			\$ 365
FUJITSU M2684s**	530MB	3.5"	13MS	5400	\$ 209	\$ 269
EC**	730MB	3.5"	11MS	4090	\$ 239	\$ 299
CONNER CFP1080S	1.2GIG	3.5" LP	9MS	5400	\$ 455	\$ 515
Hitachi DK326c-10	1.0GIG	3.5"	9MS	6300	\$ 435	\$ 495
FUJITSU M1606s	1.2GIG	3.5" LP	10MS	5400	\$ 415	\$ 475
Seagate ST31230N	1.2GIG	3.5" LP	9MS	5400	\$ 585	\$ 645

1.7GIG - 9GIG

5 YEAR WARRANTY

RAND/MODEL	CAPACITY	SIZE	ACCESS	RPM	INTERNAL	EXTERNAL
Seagate ST12450W	1.7GIG	3.5"	8MS	7200	\$ 1495	\$ 1555
Conner CFP2105S	2.1GIG	3.5" LP	9MS	5400	\$ 835	\$ 895
Conner CFP2107S	2.1GIG	3.5" LP	8MS	7200	\$ 939	\$ 999
Quantum XP32150S	2.2GIG	3.5" LP	8.6MS	7200	\$ 935	\$ 995
Seagate Barracuda	2.5GIG	3.5" LP	8MS	7200	\$ 1055	\$ 1115
Seagate BarracudaW	2.5GIG	3.5" LP	8MS	7200	\$ 1139	\$ 1199
Seagate Barracuda4	4.1GIG	3.5"	8MS	7200	\$ 1499	\$ 1559
Seagate ST15230N	4.3GIG	3.5"	9MS	5400	\$ 1155	\$ 1215
Conner CFP4207S	4.2GIG	3.5"	9MS	7200	\$ 1235	\$ 1295
Conner CFP4207W	4.2GIG	3.5"	9MS	7200	\$ 1335	\$ 1395
Quantum XP34280S	4.3GIG	3.5"	8.6MS	7200	\$ 1085	\$ 1149
Seagate Elite 9	9.0GIG	5.25"	11MS	5400	\$ 2495	\$ 2595

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Yamaha 4 speed recorder

Includes 10 Free CDs

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- Distribution
- In-house publishing
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-MacWorld Mar. '95

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Sony's latest technology →

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1.3 GB EXTERNAL **\$1949**

INCLUDES ONE CARTRIDGE

1 YEAR WARRANTY

CAPACITY	MODEL	EXTERNAL
230MB	Fujitsu	\$ 575
1.3GB	NEC	\$ 1599
1.3GB	Sony 4MB Cache	\$ 1949
1.3GB	Ricoh Turbo	\$ 2175
26GB	Sony Juxebox	\$ 6395

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With 2.5mb/sec sustained transfer, the DLT4000 is perfect for digital video or prepress with large data files.

2

Year
Warranty

CAPACITY	MODEL	MEDIA	INTERNAL	EXTERNAL
1GIG	Tandberg	1/4"		\$ 449
1.3-2GIG	DC DAT	4MM	\$ 709	\$ 769
1.3-4GIG	DC DOUBLE DAT	4MM	\$ 839	\$ 899
4.0-8GIG	Sony 5000 DDS-2	4MM	\$ 939	\$ 999
7.0-14GIG	Exabyte 8505XL	8MM	\$ 2065	\$ 2125
-32GIG	Conner Autoloader	4MM		\$ 2475
-40GIG	Quantum DLT 4000	1/2		\$ 4999
-50GIG	Exabyte-10i	8MM		\$ 2895
-140GIG	Exabyte-10h Library	8MM		\$ 4999

Our Top rated RAID Systems include a Nubus accelerator card, Remus RAID software, and all cabling and termination.

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650GIG Optical	\$ 79	120M Tape	\$ 18
1.3GIG Optical	\$ 99	CD ROM 10 Pack	\$ 89
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SYQUEST 200MB	\$ 76	SYQUEST 270MB	\$ 61

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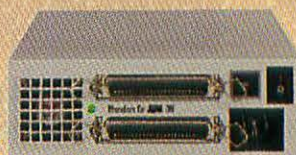
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Capacity	Model No.	Mechanism	Size	Seek	RPM	Warranty	Internal	PHASER-I
365 MB	DT-365LT	Quantum	3.5"	11 ms	4500	2 yrs	\$139	\$215
540 MB	DT-540MV	Quantum	3.5"	11ms	3600	2 yrs	\$195	\$270
730 MB	DT-730LT	Quantum	3.5"	11 ms	4500	2 yrs	\$229	\$305
1.0 GB	DT-1080FB	Quantum	3.5"	9.5 ms	7200	5 yrs	\$449	\$525
1.05 GB	DT-31230	Seagate	3.5"	9.0 ms	5400	5 yrs	\$515	\$595
2.0 GB	DT-4221	Micropolis	3.5"	8.5 ms	7200	5 yrs	\$895	\$970
2.0 GB	DT-32150	Quantum	3.5"	8.0 ms	7200	5 yrs	\$999	\$1,075
2.0 GB	DT-2490	HP	3.5"	9.0 ms	6400	5 yrs	\$1,099	\$1,175
2.1 GB	DT-32550	Seagate Barracuda	3.5"	8.0 ms	7200	5 yrs	\$989	\$1,065
2.1 GB	DT-32550W	Seagate Barracuda Wide	3.5"	8.0 ms	7200	5 yrs	\$1,075	\$1,190
4.3 GB	DT-3243	Micropolis	3.5"	8.5 ms	7200	5 yrs	\$1,395	\$1,470
4.3 GB	DT-15150	Seagate Barracuda	3.5"	8.0 ms	7200	5 yrs	\$1,465	\$1,540
4.3 GB	DT-15150W	Seagate Barracuda Wide	3.5"	8.0 ms	7200	5 yrs	\$1,550	\$1,699
4.3 GB	DT-4280	Quantum	3.5"	8.0 ms	7200	5 yrs	\$1,159	\$1,235
9.0 GB	DT-1991	Micropolis	5.25"	12 ms	5400	5 yrs	\$2,150	\$2,250
9.0 GB	DT-410800	Seagate Elite 9	5.25"	11 ms	5400	5 yrs	\$2,215	\$2,315

AUDIO/VIDEO TUNED HARD DRIVES

Capacity	Model No.	Mechanism	Size	Seek	RPM	Warranty	Internal	PHASER-I
1.05 GB	DT-31230AV	Seagate	3.5"	9 ms	5400	5 yrs	\$515	\$595
2.0 GB	DT-4221AV	Micropolis	3.5"	8.5 ms	7200	5 yrs	\$945	\$1,020
2.1 GB	DT-32550AV	Seagate Barracuda	3.5"	8.0 ms	7200	5 yrs	\$989	\$1,065
4.3 GB	DT-3243AV	Micropolis	3.5"	8.5 ms	7200	5 yrs	\$1,445	\$1,520
4.3 GB	DT-15150AV	Seagate Barracuda	3.5"	8.0 ms	7200	5 yrs	\$1,465	\$1,540
9.0 GB	DT-1991AV	Micropolis	5.25"	12 ms	5400	5 yrs	\$2,245	\$2,345
9.0 GB	DT-410800AV	Seagate Elite 9	5.25"	11 ms	5400	5 yrs	\$2,215	\$2,315

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AND ONE CARTRIDGE

Capacity	Model No.	Internal	PHASER-I
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200 MB	SQ5200	\$420	\$480
270 MB	SQ3270	\$420	\$470

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AND ONE TAPE

Capacity	Model No.	Format	PHASER-I
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4-8 GB	Sony-5000	DDS-2	\$1,099
4-8 GB	HP-1533A	DDS-2	\$1,360
5-10 GB	Exabyte-8505	8mm	\$2,199
10-20 GB	DLT-2000	DLT	\$3,599

OPTICAL

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Capacity	Model No.	Seek	PHASER-I
230 mb	Fujitsu	30 ms	\$675
1.3 GB	HP-C1716	23 ms	\$2,099
1.3 GB	Maxoptix T-III	18 ms	\$2,199

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8.0 GB	DT-15150-2AR	0, 1	\$ Call

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Syquest 88	\$48	Optical 230 MB	\$30
Syquest 105	\$54	Optical 1.0 GB	\$100
Syquest 200	\$76	Optical 1.3 GB	\$95
Syquest 270	\$60		

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8100/100, 8-700	2499	68
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8100/100AV, 16-1GB CD	3049	83
8100/110, 16-2GB w/CD	3690	100

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w/CD, & Internet Srvr for WWW		
WGServer9150/120 MHz	7244	210

Performa 6116CD	1795	86
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Apple 14" Multiple Scan	call	
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Supermac 21•TXL	2095	59
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Radius IntelliColor/20e	1829	51
Radius PrecisionColor 17	977	
Sony 20SE1 w/adaptor	1869	54
Sony 17SF2 w/adaptor	939	
Sony 15" SF2 w/adaptor	489	
Sony 1425S, 14" Trinitron	339	

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520, 4-240	1667 47



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520c, 12-320 w/modem	2697	76
540c, 4-320	2787	78
540c, 12-500 w/modem	3599	98
PCMCIA expansion mod	477	
280, 12-240 w/modem	2550	71
280c, 4-320	2987	84
280c, 12-320 w/modem	3299	92

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LaserWriter 16/600	1599	
LaserWriter 4/600 PS	815	
LaserWriter Select 360	999	
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Color StyleWriter 2200	359	
StyleWriter 1200	239	
GCC Elite XL1208	4269	119
GCC Elite XL616	2599	73
GCC ColorFast II	4499	126
HP 4MV	2699	75
HP 5MP	999	

Video Boards

Thunder IV/GX1600	2679	75
Thunder IV/GX1360	1999	57
Thunder IV/GX1152	1829	51
Radius P/Color Pro 24X	599	
Radius P/Color Pro 24XK	449	
Radius P/Color Pro 24XP	239	
Radius Thunder 24GT	1269	
Radius VIDEO VISION v2	3399	95

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EasyColor 24/1152	995
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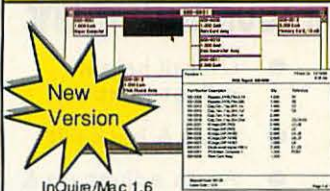
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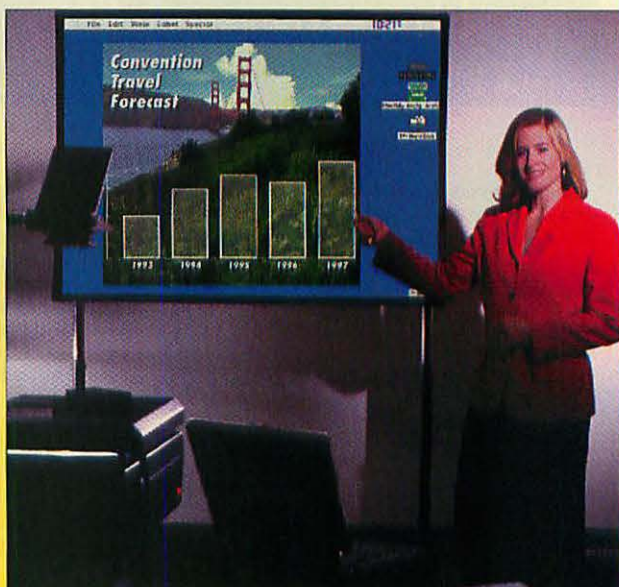
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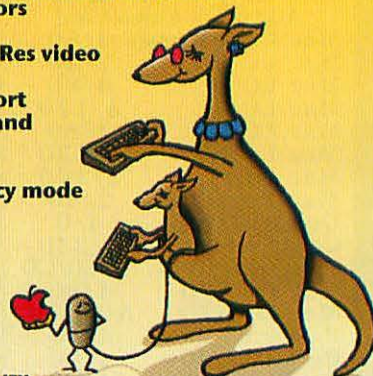
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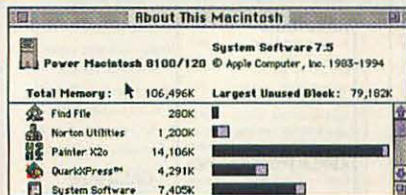
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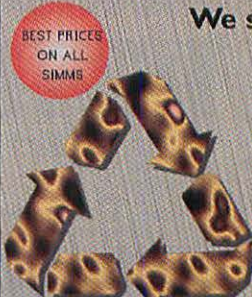
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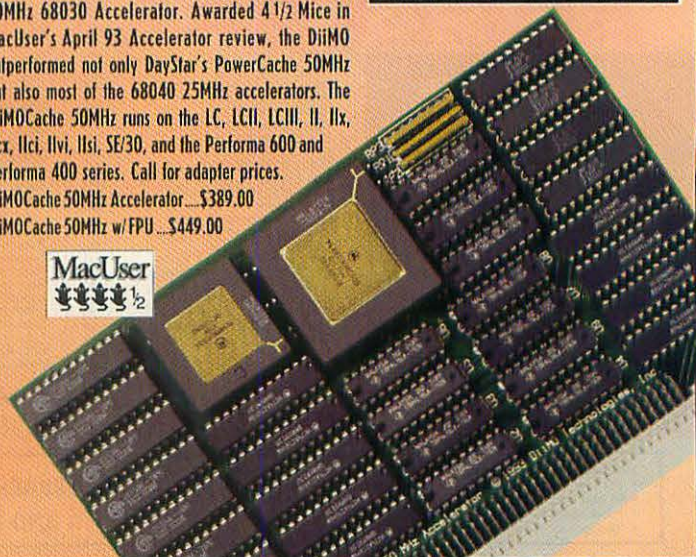
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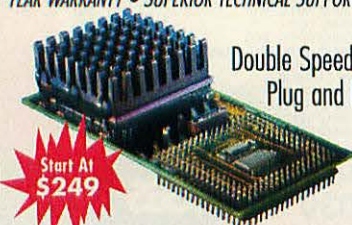
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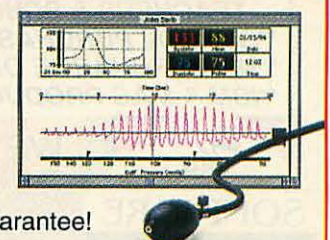
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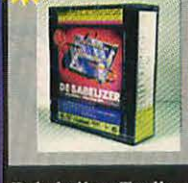
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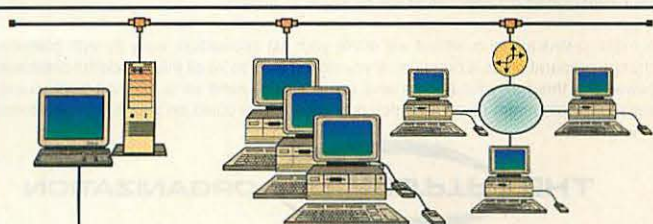
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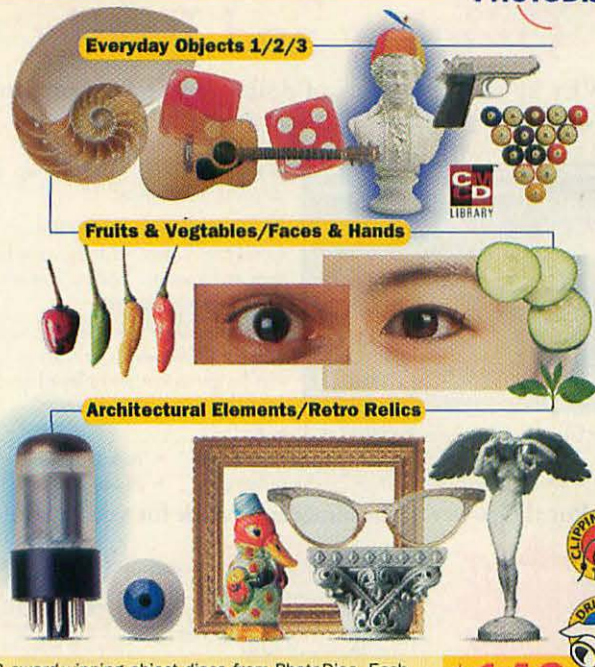
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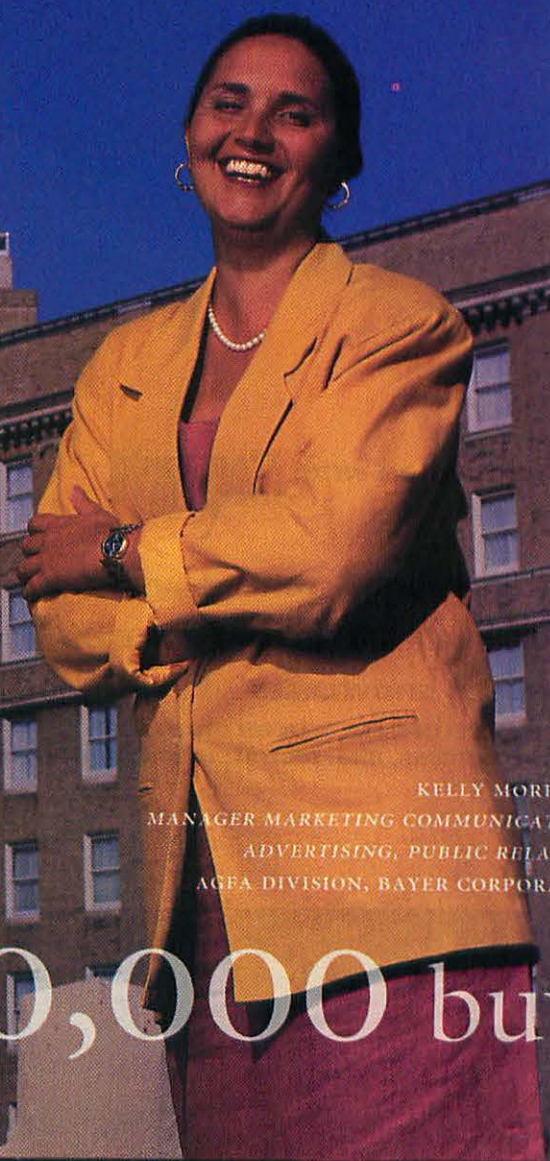
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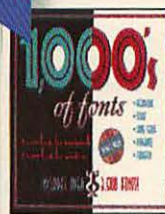
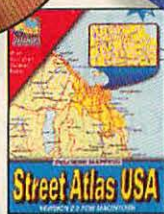
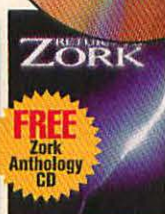
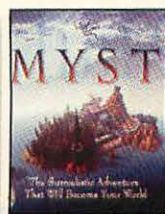
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WISE GUY

BY GUY KAWASAKI

The Rules of E-Mail

Guy helps you brush up on your E-mail etiquette

TO THE GREAT RELIEF OF MY wife, I no longer deny that I'm obsessed with E-mail. (She views this admission as the first step to a cure.) I receive 50 messages per day and send 100. When I check any of the five (down from seven) services I use, and find that I don't have E-mail, I get depressed.

My passion for E-mail has gotten so bad that I started a company to create an E-mail product—there is no greater inspiration for starting a company than wanting to use its product. And there is no greater inspiration for writing than to communicate information that directly impacts your life, so all you E-mailers out there, please observe these rules of E-mail etiquette.

Files: Just Say No

Don't send a file unless the recipient wants it and expects it. I've gotten three-paragraph letters that were sent as files with a cover message that said, "Please read attached letter." Only bozos send files when they don't need to. They assume that files will download properly and that recipients have the applications to open them. Then there's the assumption that recipients want to see the GIF file of a bozo's face or a bozo's résumé in QuarkXPress using Giovanni Book.

Don't explain your life story—get to the bottom-line reason you're writing. Many messages start off with four long paragraphs explaining the sender's life history, starting with their Apgar score. For goodness's sake, show some self-confidence. You don't need to explain who you are or justify why you're writing to elicit a response. If the recipient is going to answer, fine. If not, life goes on.

Describe the topic of your message in the subject area. This helps both you and your recipient. When your recipients have in-boxes full of messages, they are going to make the decision about which messages to read and answer based on who sent the message and what the subject is. (In my case, for example, "Love your books!" will always work.) The subject area is indispensable for the recipient who wants to find a message that was filed away.

ALL CAPS: Just Say No

NEVER WRITE IN ALL CAPS. Text in all caps is considered screaming by savvy E-mail users. It's OK to use caps for emphasis in rare instances of passion, but not for entire messages. An alternative is to put an underscore or asterisk before and after the text you wish to emphasize. Even if all caps weren't considered screaming, it's simply harder, and therefore tiresome, to read.

Quote relevant text from the incoming message in a reply. Hours, days, or even weeks can pass between the time a message is sent and when a reply is received. In that time, people can easily forget what they asked. For example, incoming message: "How's the new vacuum cleaner?" Answer, a few weeks later: "It really sucks." The convention



is to cut and paste and then place a greater-than symbol (>) or two in front of the original question or comment in order to signal that this is the issue that you're addressing.

Use carbon copies and blind carbon copies sparingly. Hardly anyone who gets a carbon copy or blind carbon copy message wants it. The sender thinks he or she is keeping people in the loop, covering his or her assets, or intimidating someone. I often get carbon copies of messages sent to Mike Spindler. Senders must think that Mike is going to be intimidated by the fact that I got the message too, that I will contact Mike on their behalf, or that Mike cares what I think. Dream on.

Chain Letters: Just Say No

Never create or forward chain-letter E-mail. There is nothing funny, cute, or redeeming about this practice. People who do this should lose their E-mail accounts. However, it is OK to send copies of interesting messages and postings—for example, the hilarious press release about Microsoft buying the Roman Catholic Church—to people you know.

Practice the Five-to-One Rule: for every five words in an incoming message, your reply should have one. Someone once told me that my E-mails are "cut but complete." He was trying to insult me, but I took it as praise. A lot of E-mail is venting of emotions. It's not necessary or prudent to respond to each and every point, arguing and commenting tit for tat. A simple, "Thanks for your comments" is sufficient.

Use signatures sparingly. Signatures are the text that people place at the end of messages. They contain information such as phone and fax numbers and company names. Some people, unfortunately, go overboard and create elaborate signatures with poetry, quotes, and ASCII art. Not that many people want to see the ASCII art rendition of your dog, so simplify your signature or don't use one at all.

The Golden Rule: Just Say So

It's impossible to cover every situation in a column, so always remember the Golden Rule of E-mail: Message unto others as you would have them message unto you. If you want to be graded on your E-mail etiquette, send me a message at macway@aol.com. I will tell you in advance, however, that messages in all caps, with file attachments, or with long signatures will fail. **m**

GUY KAWASAKI is an Apple fellow and the author of *How to Drive Your Competition Crazy* (Hyperion, 1995). His views are his own and only sporadically represent those of *Macworld* (or Apple). He has investments in America Online, Apple, Bit Jugglers, BookMaker, Global Village Communication, and Intuit. He is the president of Fog City Software, the creator of Claris E-mailer. He can be reached at macway@aol.com.

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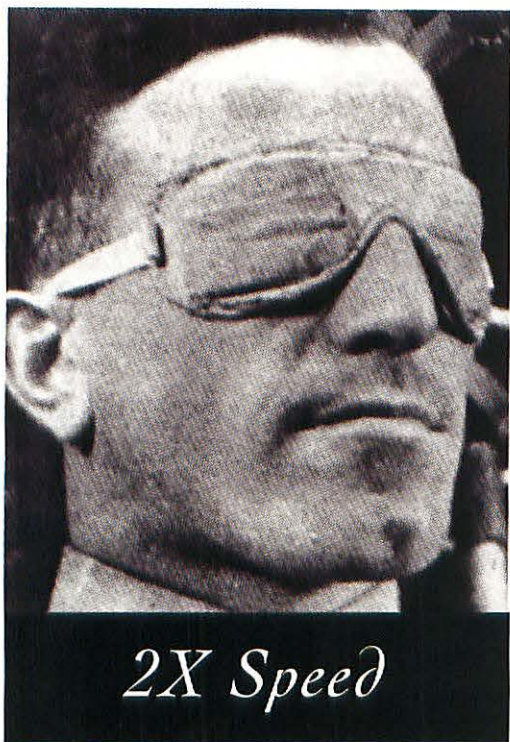
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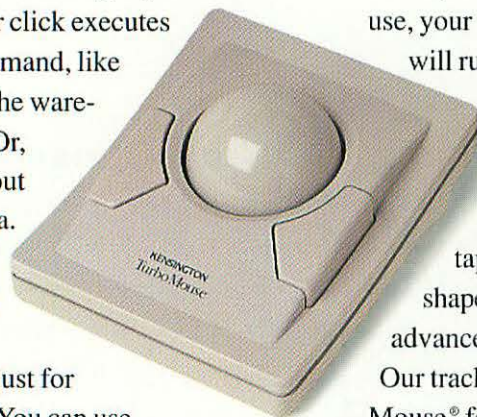
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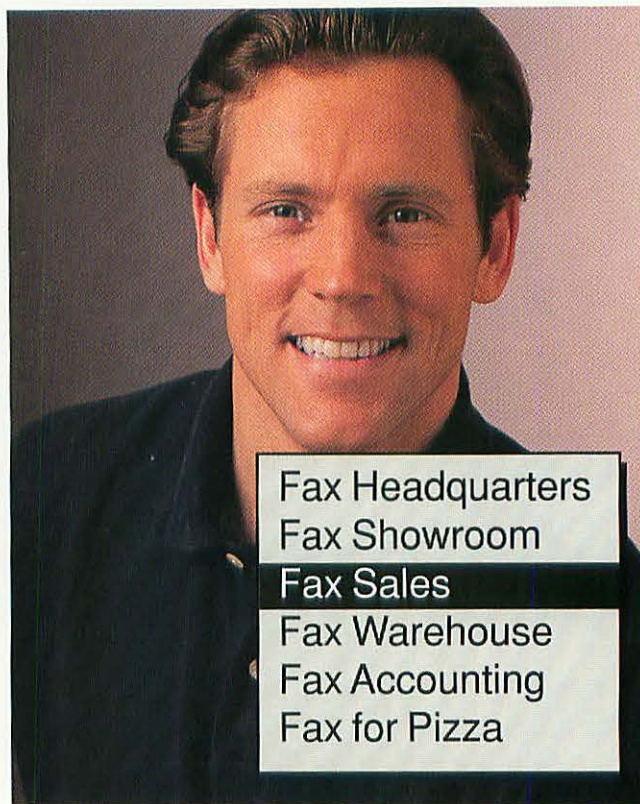
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